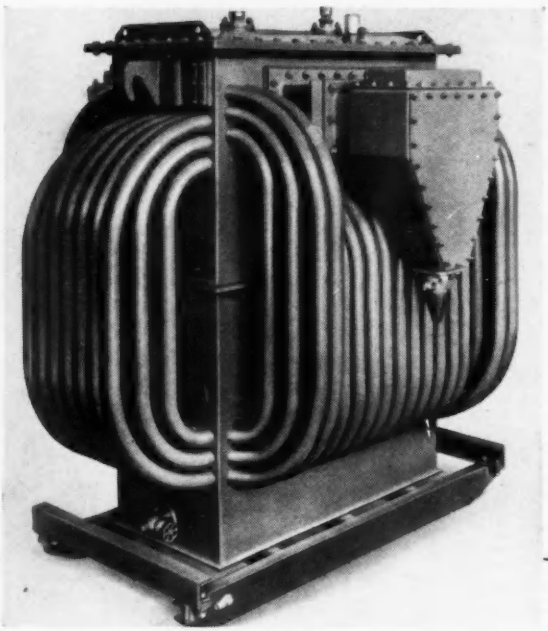
ELECTRICAL TIMES

THURSDAY
5 JUNE
1952
NINEPENCE

Standard distribution transformers for sub-stations



'ENGLISH ELECTRIC'
transformers

THE ENGLISH ELECTRIC COMPANY LIMITED, Queens House, Kingsway, London, W.C.2
Transformer Department, Liverpool

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

TL.2

FLOODLIGHTS BY

Simplex

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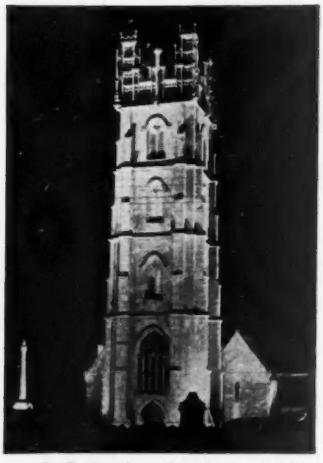

LS 50

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WIDE ANGLE (vitreous enamelled reflector)—wide flood, no defined beam

ELLIPTICAL BEAM (reflector as in Narrow Beam model)—gives horizontal or vertical ellipse beam

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LS 30 circular or elliptical beam, medium range

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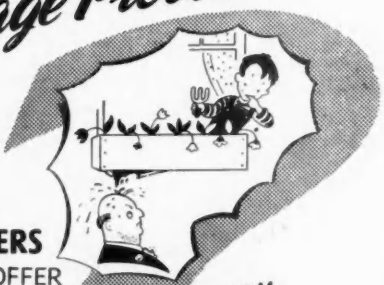

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OFFER YOU *POSITIVE PROTECTION* FOR 39/9

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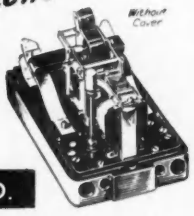

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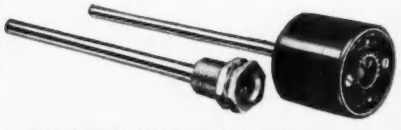

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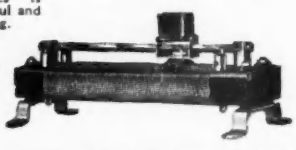

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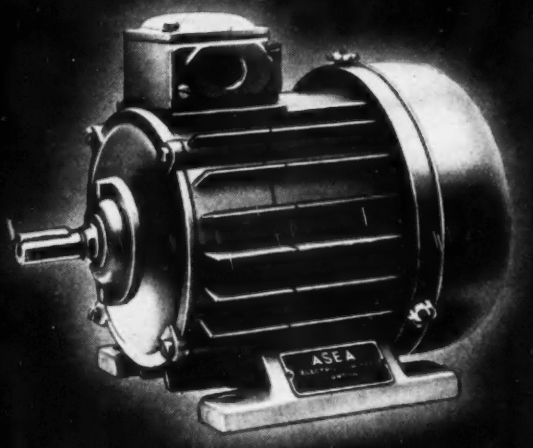

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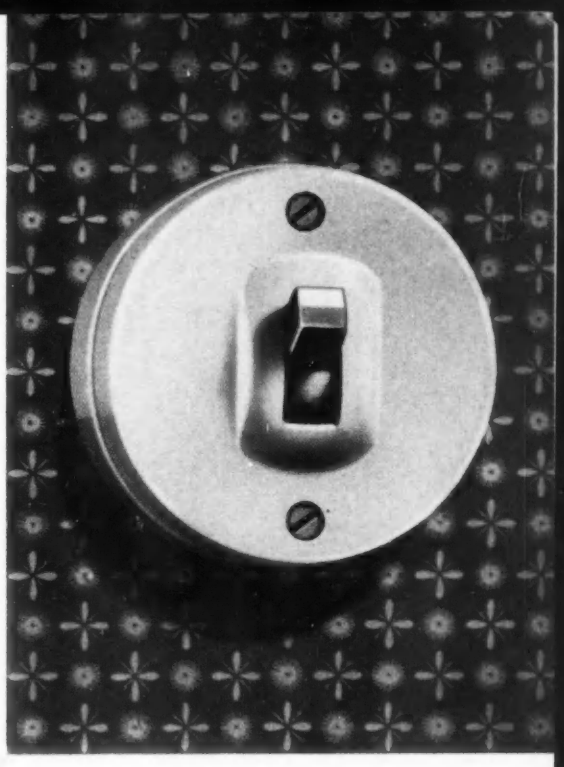

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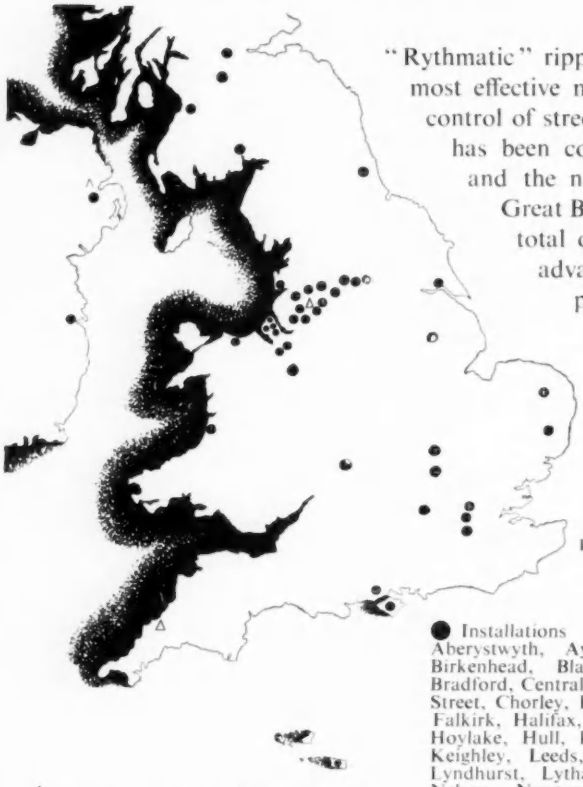
SPECIFY RYTHMATIC ★

FOR STREET LIGHTING CONTROL



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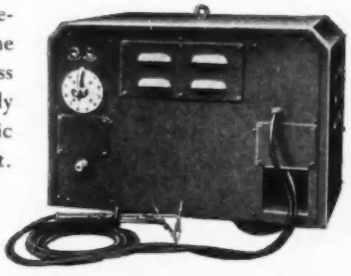

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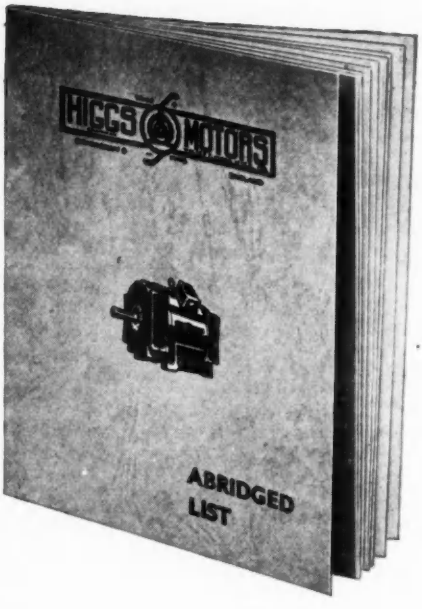

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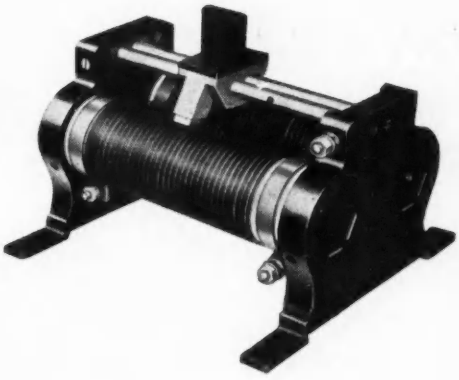

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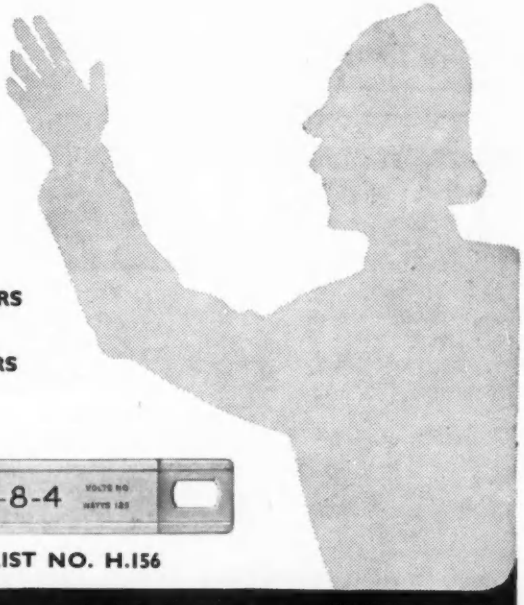

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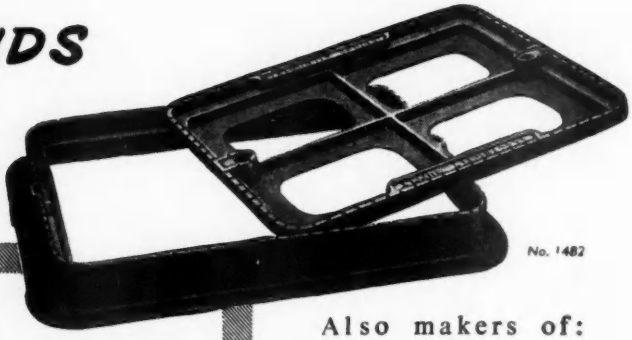

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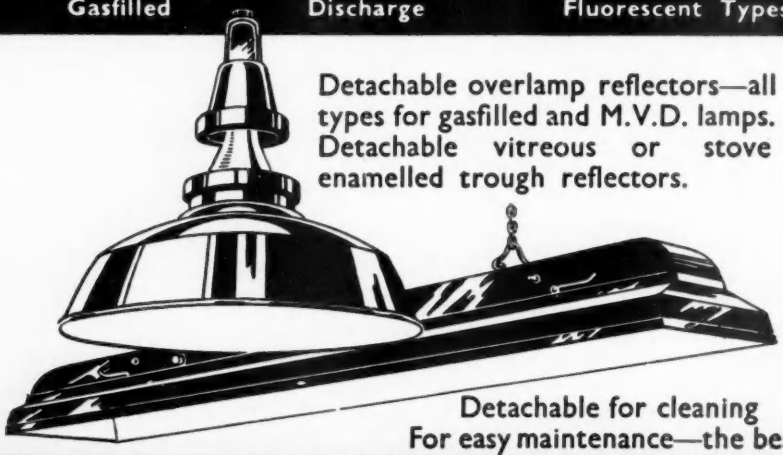

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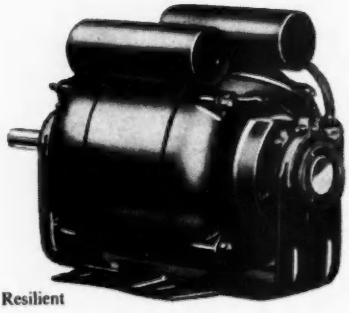
B T-H Fractional Horsepower Motors

Foot Mounted



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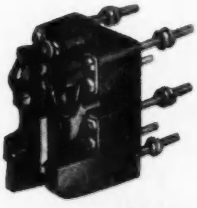

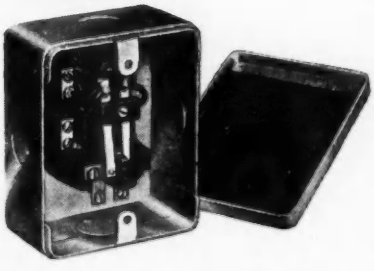

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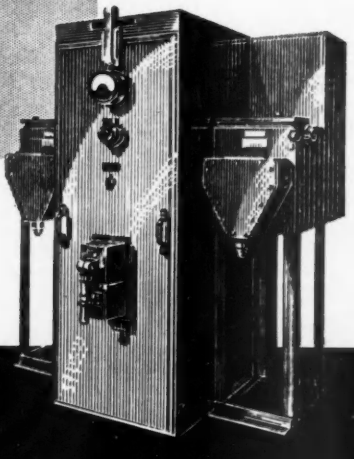
Tee-off unit may be of the Draw-out Truck or stationary Cubicle type



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This is only one of the many uses to which they, and engineers and electricians everywhere, put this famous earth tester. For instance, periodical tests are made to ensure that the initial low resistance of the pylon to earth is maintained.

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Evershed's have issued a handbook on earth testing which is an invaluable guide to the functions and versatility of the "Megger" Earth Tester. The handbook contains full details of how to make earth tests similar to those above, on your own apparatus.
Ask for Publication J.247.

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The Meter is used by the Power House Chemist for checking conductivity of various samples of water and distillate. A second "Dionic" tester is permanently installed in the Turbine Room for checking continuously the conductivity of condensate from the condensers of the four turbines. The authorities state that any contamination of condensate by circulating water due to a condenser tube leaking even slightly has been brought to light immediately by this "Dionic" meter.

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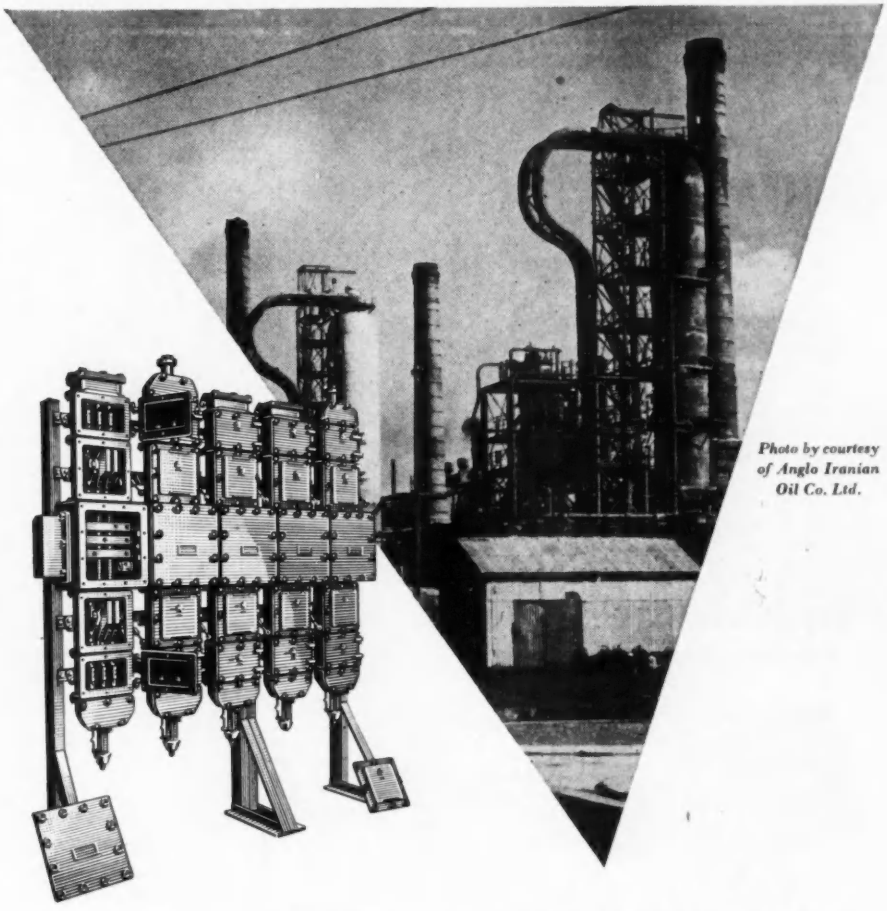

Photo by courtesy of Anglo Iranian Oil Co. Ltd.

MEDIUM VOLTAGE FLAMEPROOF DISTRIBUTION GEAR

unit-type flameproof distribution gear is the latest addition to the Reyrolle range of flameproof equipment. It is constructed with each unit in a separate flameproof enclosure. This has the great advantage of making it extremely flexible and adaptable to meet varying site conditions. It can be readily coupled to suitable medium voltage circuit breakers.

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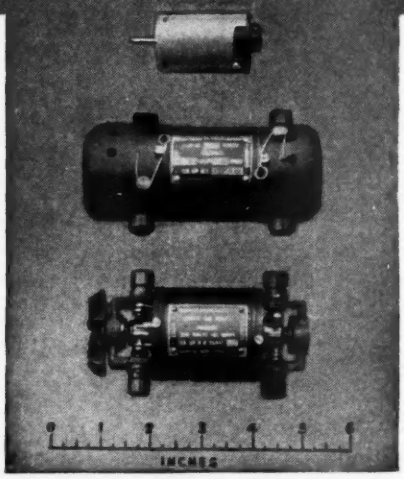
- High Frequency Alternators
- H.T.D.C. Generators

The illustration shows a small high-speed fractional H.P. motor and miniature Rotary Transformers for "Walkie Talkie" and other RADIO applications



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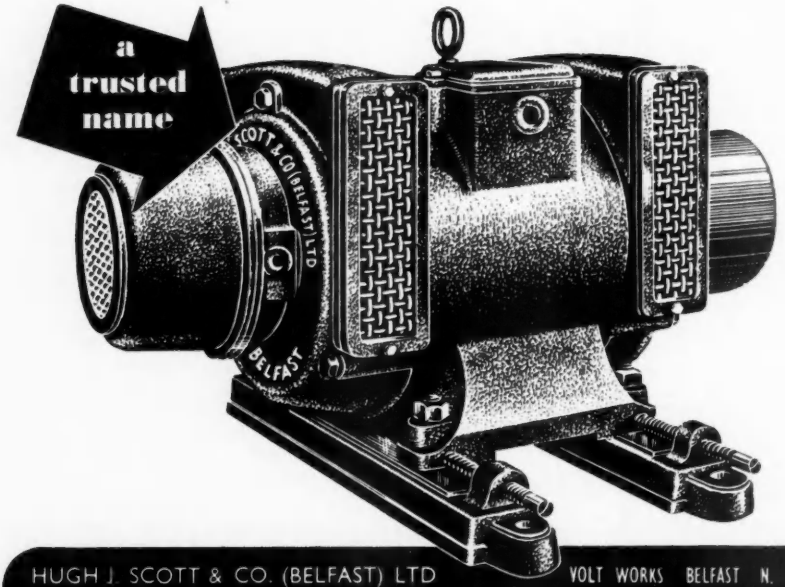

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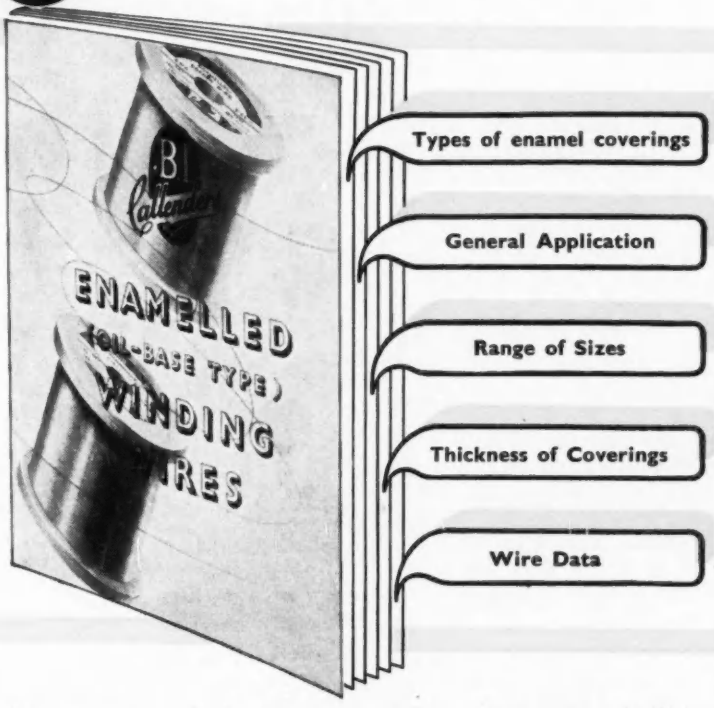
B.I. Callender's **ENAMELLED WINDING WIRES**



If you use enamelled winding wires for electrical purposes, send for a copy of this publication. It contains essential information on the range of BICC oil-base enamel covered winding wires, and includes tables and other useful data.

Send for Publication No. 303

BRITISH INSULATED CALLENDER'S CABLES LIMITED
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P & G Batteries provide many important auxiliary services to help keep Britain's electric trains running to schedule. On the new Liverpool Street to Shenfield electrification scheme, two of these are switchgear operation and supervisory control. P & G experience is spread over a very wide field and stretches back over 60 years. Specialists who know the battery business throughout will gladly discuss any projects with you. Since two heads are better than one, the results are often surprising. Our 3-point service covers **1.** *Technical Advice and Specifications.* **2.** *Equipment and installation.* **3.** *Regular inspection and report.*

2 *heads are better than* **1**

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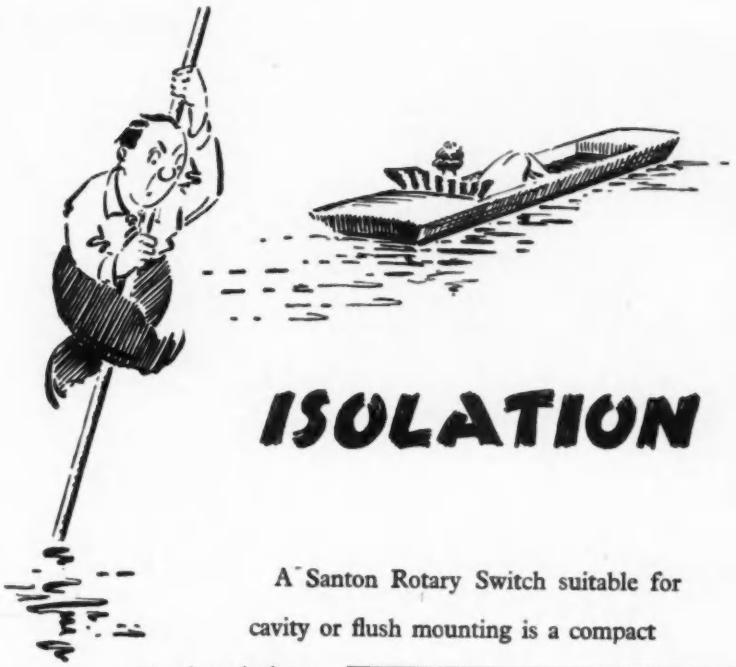

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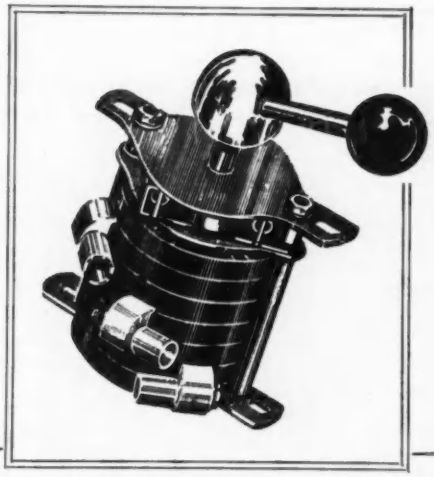
A Santon Rotary Switch suitable for cavity or flush mounting is a compact and robust isolator for your machine tool. It is also available for reversing, pole-changing and sequence control, etc. CSA approved.



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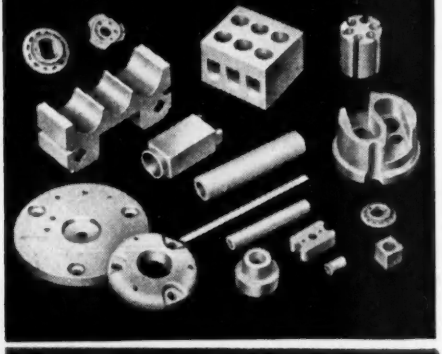

It pays you to stock the

HURSEAL

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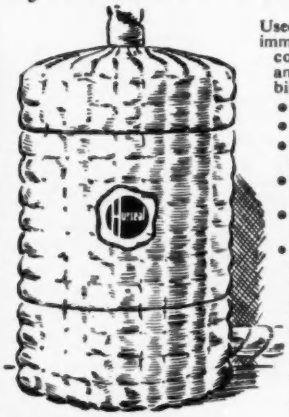

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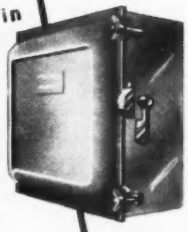
Pressure and Gravity Die Castings in Aluminium and Zinc base alloys. Sand castings in Aluminium alloys, Gun Metal, Phosphor Bronze, Brass, etc.



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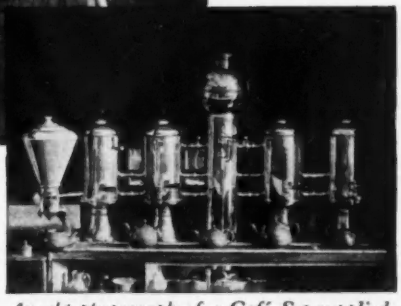
CASTINGS FOR ALL TRADES

Photographs reproduced by kind permission of Messrs. Barrows Stores, 76 Corporation Street, Birmingham 2

Café Fountain, comprising a Jackson Boiler and four 16-pint milk and coffee urns, installed in Messrs. Barrows Stores in 1948.



An old photograph of a Café Set supplied to Messrs. Barrows Stores in 1923 and in constant use until its **replacement by a modern 'Jackson' in 1949.**

Jackson Café Set gives 25 years faithful service

The 'Jackson' reputation for quality is established by years of reliable service and confirmed by many repeat orders. These come from satisfied customers whose experience leads them to install Jackson Boilers with confidence wherever a constant supply of boiling water for tea and coffee making is required.

Jackson Boilers may cost more to begin with, but every pound of their purchase price is a pound well spent in sound design, fine materials, good craftsmanship and highest-quality finish.

Jackson Boilers specialise in electrically heated machines, also gas and steam heated. Your inquiries will meet with prompt attention.

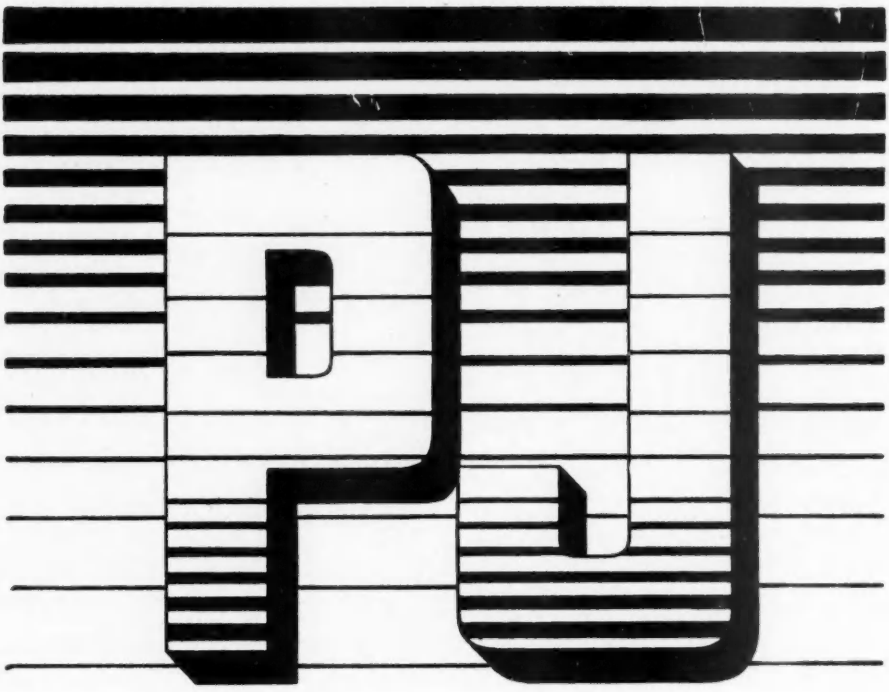
Jackson Boilers Ltd.

Vulcan Works Shafton Lane Leeds 11

Telephone 31088

The 'Jackson' Care and Maintenance Service is increasingly used by knowledgeable users

Showrooms: 25, Victoria Street (Entrance in Abbey Orchard St.), Westminster, S.W.1. 219, West George St., Glasgow. 28, Deansgate Arcade, Manchester. 9, King Street, Leeds 202, Corporation Street, Birmingham. 142, Victoria Street, Bristol.



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AUTOMATIC EARTH PROVING SUPPLY SWITCH

An invaluable Safety Device for protecting the Operators of all Portable Tools

Its use ensures the continuity of Earth Connection for all Portable Tools so that no Tool can be energised unless the Earth Lead is intact.

The Switch provides a supply point which secures the immediate isolation of any suitably wired Tool should its earthing become defective.

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TEMCO *the Perfect*
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With Q. M. & B. Switch (silver plated contacts) No. 653 7'4 each

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DELIVERIES FROM STOCK

No longer any need to accept any but the best—thanks to increased production the connector that everyone wants is now in plentiful supply.

- Made to B.S. 562.
- Double sided earth.
- Independent cord grip; no strain on conductors.
- 2-part phosphor-bronze ringed contact sleeves.
- Extra solid bakelite housing.
- Each one packed in a carton.

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SUPER IRON CONNECTORS

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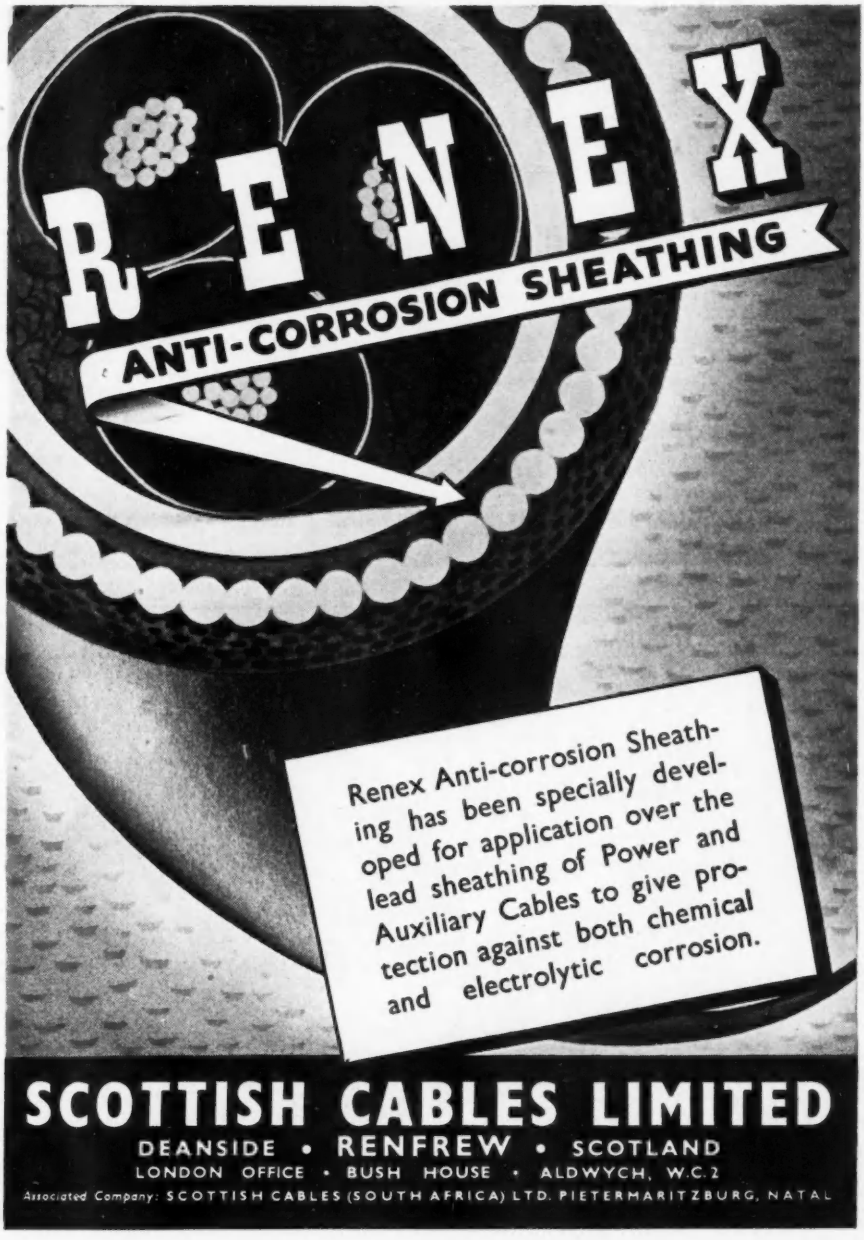
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ANTI-CORROSION SHEATHING
Renex Anti-corrosion Sheathing has been specially developed for application over the lead sheathing of Power and Auxiliary Cables to give protection against both chemical and electrolytic corrosion.
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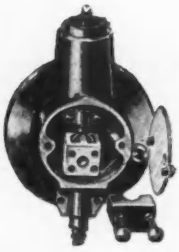
INDUSTRIAL LIGHTING UNITS



The Connection Box in the base simplifies both installation and maintenance. The cabtyre sheath of the cable is clamped to prevent damage to the cores. Visible earth screw. Bases for wall, bench, ceiling, floor or for mounting direct on machines, as well as portable types. Some with entries for screwed conduit, others with rubber sleeve and clamp for supply cable as illustrated.

Various lengths of arms (maximum horizontal reach 54 in.). With pillar or short vertical pivot. Alternative sizes of reflector.

In place of the standard "head" a sudsproof type and another for Edison screw lamps are available.

Catalogue sent free on request

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Horstmann Electric Time Switches are renowned for their unfailing reliability. The comprehensive range covers hand wound models (15-, 21- and 40-day run), electrically wound and synchronous models with or without spring reserve as required.

May we quote you for your requirements?

Unfailing Reliability

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FOR PUBLIC LIGHTING INDUSTRIAL AND DOMESTIC USE

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NEWBRIDGE WORKS · BATH · ENGLAND · TEL: BATH 7241 · GRAMS: HORSTMANN BATH

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That has been our principle for 30 years in the design and construction of

HEATRAE ELECTRIC WATER HEATERS

which are built to work efficiently day-in, day-out with an irreducible minimum of attention.

The Electrical Industry has shown no small appreciation of this Heatrae "asset."

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HEATRAE LTD · NORWICH · NORFOLK

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A G.E.C. PRODUCT

- Easily installed.
- Quiet in operation.
- Consumption only 25 watts.
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This Window Fan carries a ***National Physical Laboratory Certificate*** confirming its performance.

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Cables

C.M.A. Members were the first in the world to develop and produce:

66 kv, 3-core Gas Compression Cable

100 kv, D.C. Single Core Cable

132 kv, 3-core Gas Pressure Cable

275 kv, Single Core Gas Pressure Cable

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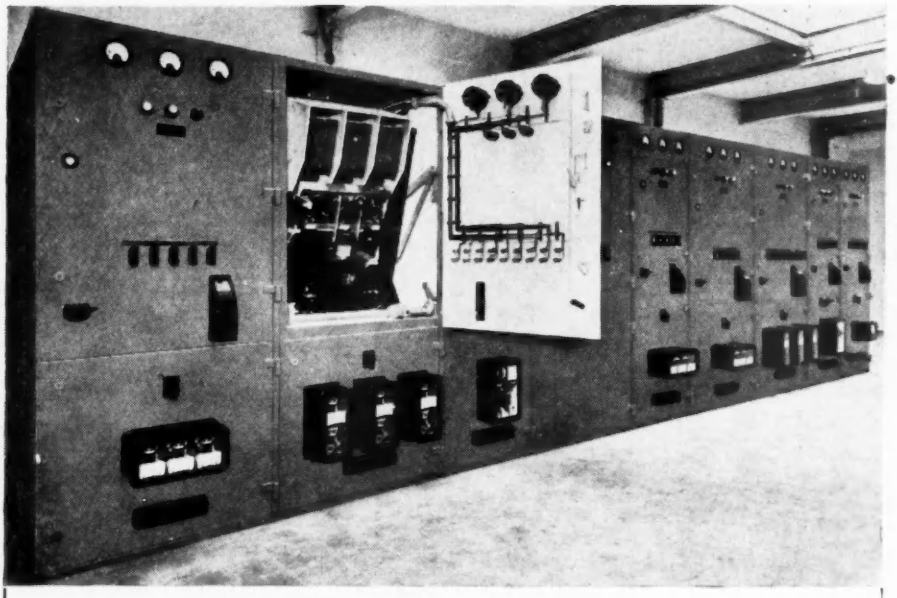
52/54 HIGH HOLBORN, LONDON, W.C.I. TELEPHONE: HOLBORN 7633

Indoor circuit breakers for 3000 amps



'ENGLISH ELECTRIC' pioneers of heavy duty air circuit breakers, have had unrivalled experience in the design and manufacture of this highly specialised equipment. Designed for indoor use in power stations and by industrial consumers, type OB air circuit breakers are available for medium voltage and 3·3 kV systems. The type OB.4 air circuit breaker switchboard illustrated has a rating of 3000 amps, 660 volts and 25 MVA when tested to B.S.116, and it can be arranged for hand or electrical operation.
'ENGLISH ELECTRIC' type OB air circuit breakers are designed for safe and consistent operation, for reliability under all conditions of service, with the minimum maintenance cost.

'ENGLISH ELECTRIC'
switchgear

THE ENGLISH ELECTRIC COMPANY LTD., Queens House, Kingsway, London, W.C.2
Switchgear Department, Liverpool

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON
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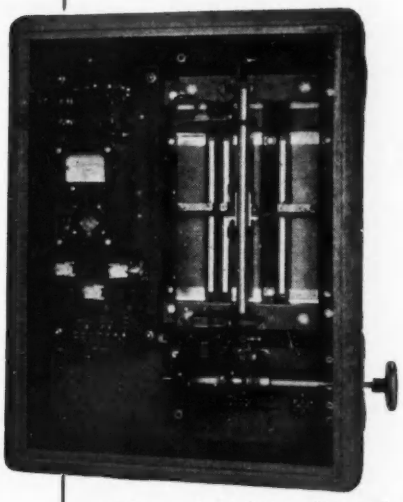
What is VF* *costing you?*

If your plant or process depends on an absolutely constant mains voltage, then "V.F."* (Voltage Fluctuation) may be costing you much more than you realise. Every ± variation results in loss of efficiency, and increases operating costs. That is why BERCO and BPT voltage control and regulating equipment plays an important part in well planned industries all over the world — keeping voltage under control!



3-phase, air cooled, wall-mounting model. Input 440V. ± 10%, output 440V. ± 1%. 7½ amps.

BERCO hand-operated single-phase Regavolt

For constant voltage use a model from the wide range of Automatic Stabilizers made by British Power Transformer Co. Ltd., for single and three phase supplies.

For variable voltage select a "Regavolt" from the wide range of models made by The British Electric Resistance Co. Ltd. Interesting information and full performance details given in booklet No. C1021.

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MODEL 7 Universal AvoMeter

The world's most widely used combination electrical measuring instrument. It provides 50 ranges of readings on a 5-inch hand calibrated scale fitted with an anti-parallax mirror, and is guaranteed accurate to B.S. first-grade limits on D.C. and A.C. from 25c/s to 2 Kc/s. The movement is effectively damped to facilitate reading. The meter will differentiate between A.C. and D.C. supply, the switching being electrically interlocked. The total resistance of the meter is 500,000 ohms. The instrument is self-contained, compact and portable, and is protected by an automatic cut-out against damage through inadvertent application of overload. Power Factor and Power can be measured in A.C. circuits by means of an external accessory (the Universal AvoMeter Power Factor and Wattage Unit).

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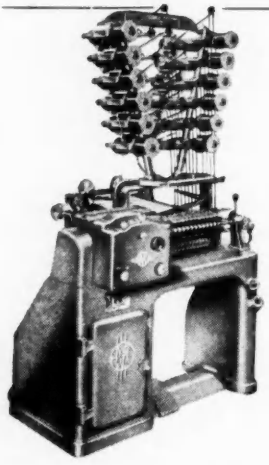
VOLTAGE: A.C. and D.C. 0 to 1,000 volts.
RESISTANCE: Up to 40 megohms.
CAPACITY: ·01 to 20 mFds.
AUDIO-FREQUENCY POWER OUTPUT: 0—2 watts.
DECIBELS: —25Db. to +16Db.

Various accessories are available for extending the wide ranges of measurements.

£19:10s.

Size: 8" × 7¼" × 4½"
Weight 6¾ lbs. (including leads).



The 'DOUGLAS' *Fully Automatic* MULTI-WINDER

Specially developed for the high-speed production of large quantities of coils with or without paper interleaving. It will produce round, square or rectangular coils up to 6 inches each in length and up to 4½ inches diameter. As many as twelve smaller coils can be wound simultaneously within the total available winding length of 15 inches at headstock speeds of between 600 and 2,000 r.p.m. The machine is fitted with a rapid-change gearbox which provides 153 different traverse speeds. It reduces the setting-up time and also enables adjustments to be made for varying diameters of wire which may occur during the winding of a batch of coils.

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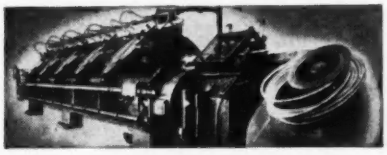
MODERN TELEPHONE SYSTEMS demand wire of the best quality, manufactured to the most precise specifications. The Metals Division of I.C.I. is well-equipped to supply such wire, in high-conductivity copper, cadmium-copper, and bronze. The Division is pleased to help with all problems concerning fabricated non-ferrous metal products.



A modern plant for wire manufacture.

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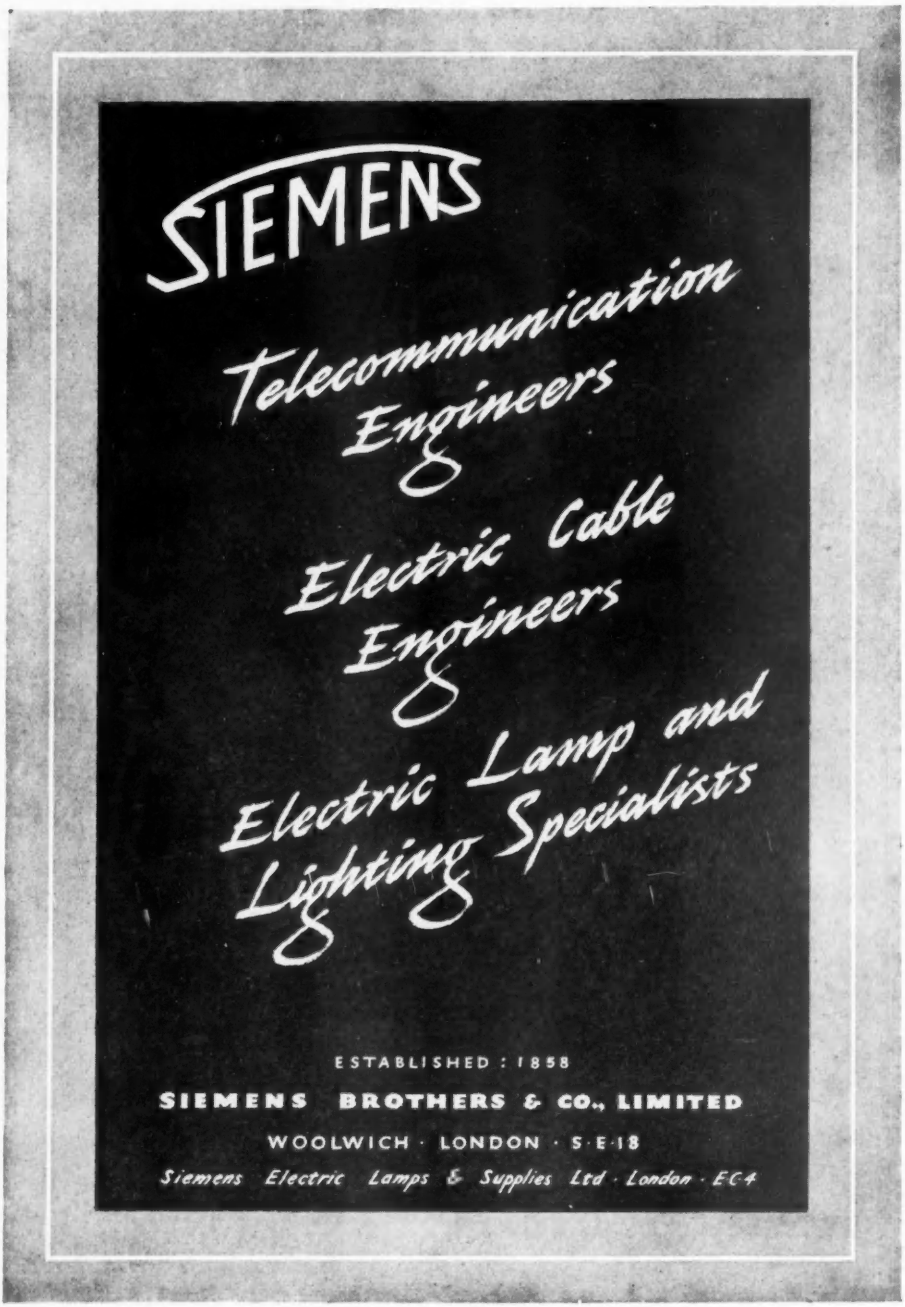
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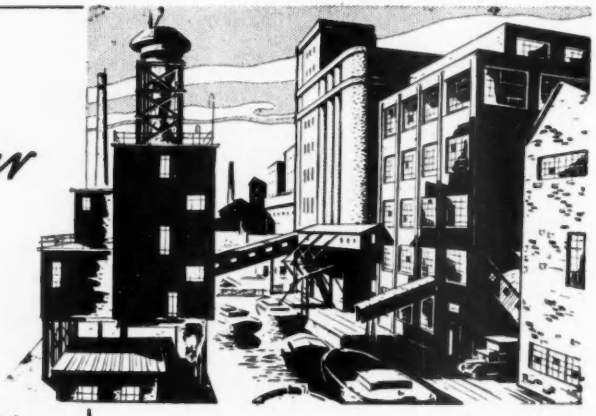
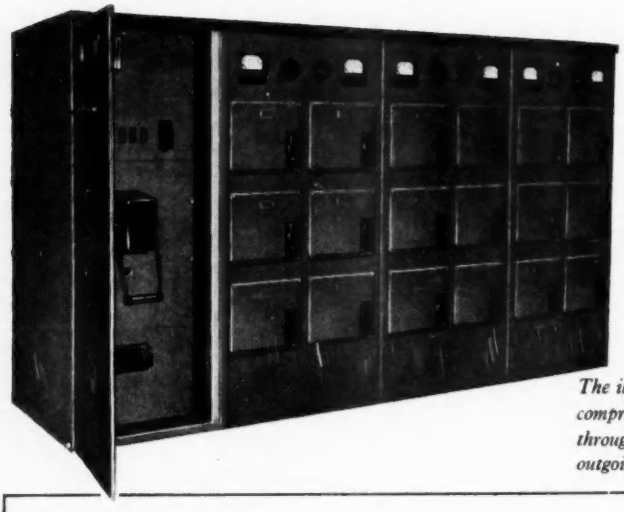
L.V. Switchgear for public supply or industry...





BRUSH
Switchgear whether embodying fuse switches or circuit breakers is robust in construction, readily accessible for maintenance—and easily extensible

The illustration shows switchboard comprising incoming feeder controlled through a circuit breaker and outgoing fuse switch circuits

the best answer is BRUSH

The Brush Electrical Engineering Co. Ltd. Loughborough England (*A member of the BRUSH ABOE group*)
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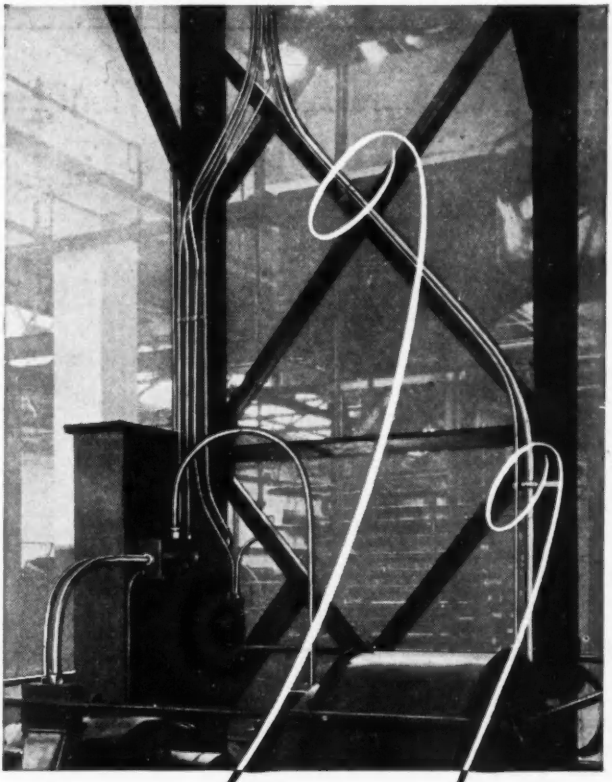

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. . . it's surprising how few

. . . supports are required for J. & P. Aluminium Sheathed Cables. The lightness and strength of the aluminium sheath greatly facilitates erection and reduces cost considerably.

British Patent Nos. 627815 & 627793

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CHARLTON LONDON S.E.7
The mark that means that "little more" in quality

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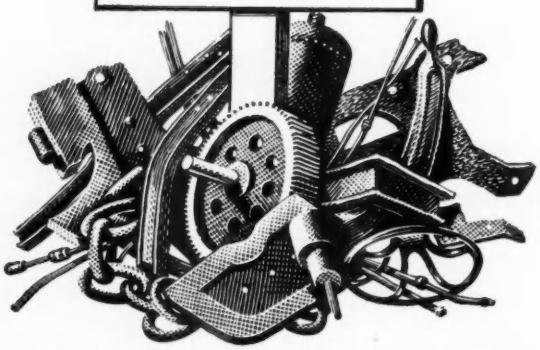
WHAT EVERY MANAGEMENT SHOULD KNOW ABOUT

scrap



What is scrap? Obsolete plant and machines, old spares, redundant buildings — anything made from iron and steel for which you have no foreseeable use.

What good is it to me? No good at all in its present state. But send it back to the steelworks and it can go to make the new steel that you and all steel-users need. Remember—a ton of scrap may make a ton of new steel.

Can't they make steel without scrap? Yes — but not enough steel. Last year, 58% of our steel was made from scrap. The more scrap we use the more coal, coke and iron ore we save for other important purposes.

What should I do with my scrap? See your local scrap merchant. He will be glad to help with dismantling and collection. If you have any trouble disposing of iron and steel scrap, write to the British Iron & Steel Federation for the address of your Joint District Scrap Committee.

What shall I get for it? You will be paid a fair price for your scrap. MORE IMPORTANT — you will be doing yourself and all steel-using firms a great service by helping to increase steel production.

SPEED THE SCRAP

SPEED THE STEEL

Issued for the STEEL SCRAP DRIVE by the British Iron and Steel Federation, Steel House, Tothill St., London, S.W.1

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ELECTRICAL TIMES

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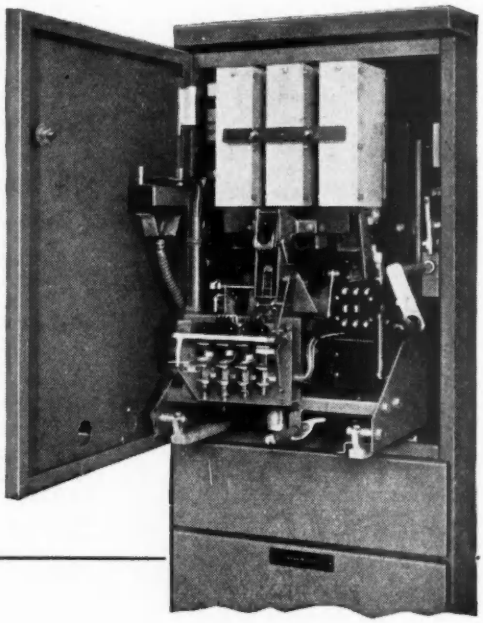

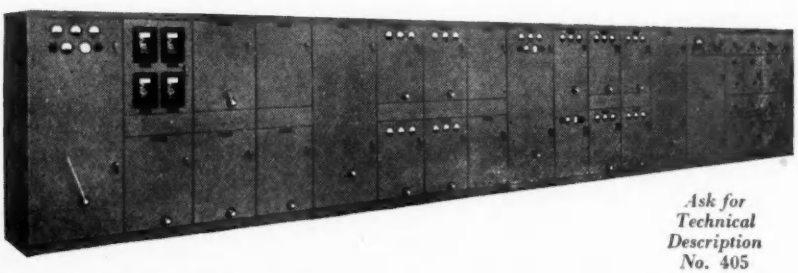

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THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Editorial

C.I.G.R.E. GROWS IN STRENGTH

THE growing popularity of the Conférence Internationale des Grands Réseaux Electriques, more generally known as C.I.G.R.E., is well shown by the increasing membership recorded each successive year. At the present Conference now being held in Paris, the number of delegates is higher by over one hundred than ever before. And this is despite the relative lack of delegates representation from countries behind the iron curtain. As DR. R. A. SCHMIDT, chairman of C.I.G.R.E. emphasised in his opening speech on Wednesday, the object of the Conference is to foster and facilitate the exchange of technical information between nations and individuals irrespective of politics or national frontiers. This is borne out by the delegates representing some 42 different countries who are attending the present proceedings. With this wide range of practical experience and knowledge available, it is to be expected that many new ideas and concepts should be discussed and considered. The Conference is thus of particular importance to the British delegation, several of whom are concerned with the 275 kV grid system now being built. With this aspect of the proceedings, as with many other subjects which have been discussed at its sessions, we shall be dealing at length in our next issue.

OUTLOOK FOR THE ATOM

LAST week's official description of the work proceeding at Harwell added little to what has been already released in a more technical form. It is, however, noteworthy that the impression still seems to be, that the first reactor built specially for the generation of electric power will be of the natural uranium, non-breeding, type. The economics of such a relatively simple and inefficient source of nuclear energy if widely applied depend on the price of the fuel, for it uses its uranium charge in comparatively large quantities when compared with the other types of reactor. So while the intensive work of reactor design is proceeding, there is much effort going into solving the companion problem of developing low grade sources of uranium. Since modern techniques enable metals to be extracted economically by crushing and flotation when ores contain them as only a few parts by weight in every million, the problem does not seem insoluble, for uranium is present in many common rocks to greater concentration than that. More important perhaps, is whether it will be solved before the metallurgical and engineering difficulties associated with breeding reactors are successfully overcome. With both possibilities being intensely studied, Sir John Cockcroft's 1950 estimate of 1958 for the first reactors designed for electric power production seems likely to be realised.

MUDDLED ECONOMICS

SOMETHING like the old fear of the gas industry for the virtues of electricity was apparent at last week's annual meeting of the Institution of Gas Engineers. The president, in his address, had some harsh things to say about the competing supply industry, and he singled out its tariff policy for special attack. By some unrevealed juggling with figures, he had found that the gas industry could not obtain electricity for its works "on such favourable terms" as the domestic consumer. The present attitude of this industry is well represented by the arrogant threat, that if electricity did not mend its ways, recourse must be had to legislation. It was, however, surely unworthy of the president of any engineering institution to be still muddled about the effect of the domestic consumers' "poor load factor" on supply economies. Sir John

Hacking made it quite clear recently that the supply industry will not countenance that allegation any more; a low load factor demand occurring at the right time improves the overall load factor, and thus the general efficiency of a system.

TROLLEYS UNDERGROUND

UNDERGROUND transport methods are a key problem in the search for increased efficiency and productivity in coal mining. That the N.C.B. is actively aware of this is clearly shown in their annual report for 1951, which notes many advances in technique. Electric power is widely used for this duty, and an interesting extension of this application is forshadowed in an experiment that is now planned using electric locomotives supplied from overhead trolley wires. Bare trolley wires are prohibited underground in British mines under the safety regulations that govern the use of electricity, but special permission has been given for a trial of the system. The imminence of this experiment recalls the report of the productivity team from the coal industry which visited America 1951, for in that country the use of the trolley locomotive for main and secondary haulage is widespread. It was apparent that the team was impressed with the operational flexibility that this scheme offered and with the economy of its working. They were, however, severely critical of the safety aspect in the particular conditions of working which they saw. Doubtless this can be improved on in many ways, though experience with crane trolley wires in factories suggests that it will not be easy to find a complete answer.

DEMAND FOR ENGINEERS

IT is common ground in all discussion on technological education, that more scientists and engineers are needed if British industry is to increase its productivity. Just how these men are to be trained is a continuing subject of controversy, and although the Advisory Council on Scientific Policy does not tackle the problem explicitly in its annual report, it makes some points which have a direct bearing on the matter and will no doubt be widely quoted in future debates. Although the view is expressed that technical colleges can help considerably, it is made clear that in the Council's opinion they can provide only a partial answer to the problem of supply. Expansion of the facilities offered for scientific education at the universities is, according to the report, the only hope of a complete solution. There is evidence that so far as electrical engineers and most other technologists are concerned, there is no prospect of supply exceeding demand for the next five years. After that, if productivity is expanding at the rate needed to keep this country a great power, large numbers of engineers and scientists are certain to be needed even in the absence of such abnormal conditions as are provided by a rearmament programme.

POWER IN THE NORTH

LARGE scale planning requires that careful investigation and rational evaluation shall take the place of those many random influences which were effective in the past in deciding such matters as the siting of industry. An obvious question that has to be studied is the availability and location of fuel and of other sources of the energy that is needed for production. It is most appropriate, therefore, that the Scottish Council (Development and Industry) should have decided to set up a special committee to relate future industrial needs and possible power sources. What is particularly pleasing about the atmosphere in which the committee has been established is the assurance that it will be forward-looking in its attitude to technological development. Such machines as peat-burning gas-turbines and nuclear power reactors may be of decisive importance in determining the industrial future of the more remote parts of Scotland. The report that the committee will eventually produce should provide a valuable and well-informed picture of possible power developments which may have a startling effect on the geography of industry some twenty years hence.

Meteor

Repair and Maintenance of SMALL ELECTRIC TOOLS

First of a series of articles in which practical problems are discussed

By KARL WILKINSON

TWO outstanding achievements in the electrical world during the past thirty years are the development of the single-phase f.h.p. motor and of the portable electric tool powered by a universal motor. Portable tools, a generic term since many of them can if necessary be fixed in position and so become an ordinary machine tool, have now reached such a peak of perfection and useful application that they are taken for granted and few people realise either their diversity or the vast numbers in use.

Like every other piece of apparatus they require servicing and repairing; indeed regular servicing is a *sine qua non* where reliability is required. Whereas an ordinary motor, especially if three-phase, will run for very long periods without attention, the portable tool, by reason of its high duty and compactness, demands frequent attention if it is in use for regular or long periods. Many maintenance men have experience of motors that have been running for years with only an oilcan as attendant necessity; no matter how excellent a portable tool may be, it will not suffer likewise.

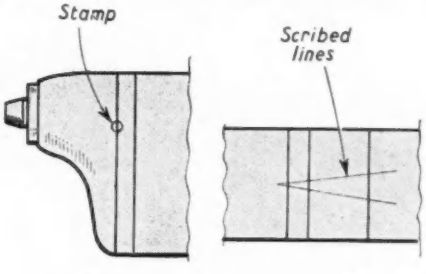


Fig. 1. Suggested method of marking tools

Power for these tools (excluding Hi-cycle) is obtained from a compactly designed universal (series) motor which may develop well over 1 b.h.p. although the armature is small enough to go in one's pocket. The output is obviously derived from the high speed and heavy duty of the windings. This immediately gives us two problems : wear from high speed and vibration, and wear on the commutator and brushes. These two points added to the accumulation of dust and grease give a key to the attention required.

In describing the overhaul of these machines it is—because of the diversity of types—too big a job to particularise. Hence a general procedure and treatment must be adopted. In addition it is not assumed that the repairer has unlimited equipment.

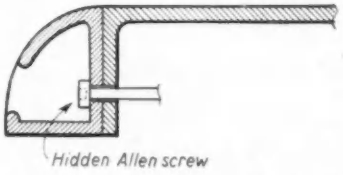


Fig. 2. Hidden bolt-head in woodworking tool

Dismantling

Unless it is necessary to give the machine a preliminary run for test purposes, the first step is obviously to dismantle it. In most cases the method to be adopted in dismantling is obvious and needs no comment. Such is not always the case as some tools are exceedingly difficult to open up and, quite apart from purely mechanical troubles, the mode of assembly can be very puzzling. Generally speaking a machine of good design will dismantle easily—witness certain early German mechanisms where the difficulties of the maintenance man have been thought of by the makers, and such details as screwdriver slots machined between two faces of a forced joint are carefully provided.

If a tool is not well known it is always advisable to mark the various pieces to facilitate their re-assembly later on. Try to avoid the use of centre pops for this purpose as some pieces of apparatus, after being repaired a number of times by different people, become so pop-marked that they appear as a kind of chicken-pox rash, and the marks become valueless or actually misleading.

Two methods are good. Fig 1a shows the

use of an O stamped over the joint line between two pieces, and Fig 1b a very sound method of two scribed lines over a number of assembled pieces that will record the order of assembly.

We can now deal with a few examples of dismantling difficulties. In one make of woodworking tool the main housing bolt heads are hidden behind a deep cavity at the commutator end of the machine. Access to the screws is via two ventilating holes drilled in the casting,

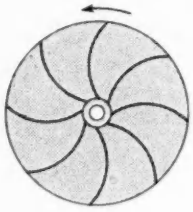


Fig. 4. Direction of rotation of impeller with reference to blade shape

consequently the bolt heads are often invisible because of the accumulation of wood dust in this cavity. Moreover, these are Allen screws and the standard key is too short to reach them. See Fig 2.

If the main housing has been parted quite easily, the next trouble is frequently the removal of a part which obviously covers further housing bolts. We can quote as examples the assembly of blowers, pumps and gear heads where the impeller or gear must first be removed to reach other fixings. Fig 3 (1) shows a very common method both for impellers and for pinions and drives where the rotation is always unidirectional. Having determined the hand of the thread, either by inspecting the impeller, and remembering that they always rotate as in Fig 4, or in the case of a pinion by the direction of the final drive of the gear assembly, or by the wear on one face of the pinion teeth, the part is removed by a smart blow with a mallet or hammer and drift. Watch out for additional fixings such as grub screws and taper pins. Some machines provide either a saw kerf in the other end of the shaft or a flat on the shaft *inside* the motor which is reached by a long thin spanner passing through the ventilating holes in the motor body. Fig 5.

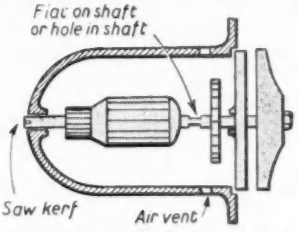
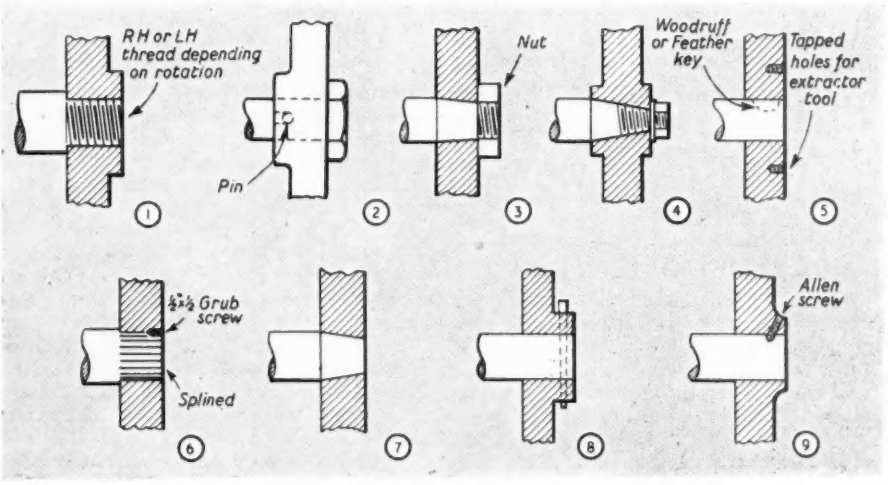


Fig. 5. Alternative methods provided for shaft manipulation in some tools

Apropos the curved bladed impellers, it will be found that very early machines may have the blades rotating the other way, while the impeller itself may have sinusoidal blades and be rather misleading.

Fig 3 (2) gives no trouble but (3), (5), (6) and (7) usually require a puller to remove them. They can at times be shifted by a smart blow with a mallet, in the case of fig. 3, *with the nut*

Fig. 3. Fixing methods met with for impellers and pinions in portable tools



slackened and still in position. Fig 3 (6) is frequently used for pinions. Gentle heat and penetrating oil will help in all cases.

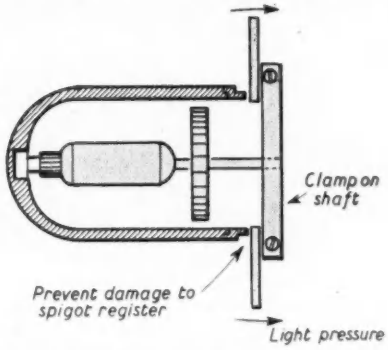


Fig. 6. Construction that requires the use of a puller

Referring to Fig 6 it will be appreciated that such a construction makes internal accessibility awkward and even if the fan, impeller or gear has been satisfactorily removed, together with the end plate beneath it, the armature itself may refuse to come out if the bottom bearing, usually the commutator end, is too tight a fit in the housing. Consequently the armature must be pulled out; but on no account use the cooling fan as a purchase for a lever. These fans are often very frail, being die-cast or of light-gauge pressed steel. Fig 7 shows one half of a very

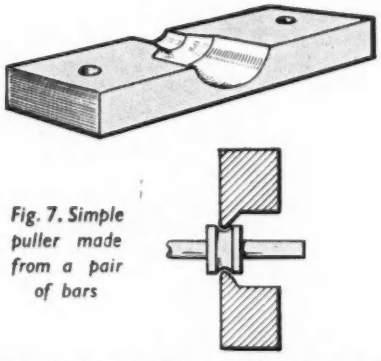


Fig. 7. Simple puller made from a pair of bars

simple puller made from a pair of bars, which will be used for another purpose later on. The withdrawal of the field assembly will be dealt with in the section on field windings.

Two warnings are necessary here while still dealing with this type of housing. Some early models have an oil tube passing from the bearing boss to the surface of the body (see section on bearings). These must be unscrewed before the end plate, with or without the armature, is drawn. Secondly, one method of assembly has an asymmetrical armature cooling fan with a flat or recess on either side. Hence the armature must be rotated until the fan will clear certain bosses left on the inside of the housing. A similar method is used in the normal open-ended carcase on other models. In all cases do not forget to remove the brushes.

There is on the market an ever-growing number of mixers, many of foreign make. Here again we have a semi-blind tunnel and

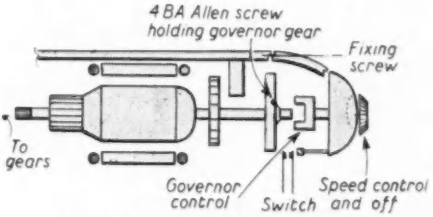


Fig. 8. Details of food mixer assembly

one end of the housing contains the gear head. This is shown schematically in Fig 8, which also shows a speed control using a governor gear with the cap moulding acting as a switch and controller. The cap and head are easily removable but the governor gear, especially if dirty, may be a puzzle, The machine in question has a very small 4 B.A. Allen screw passing through the governor gear moulding in a recessed hole that can be quite easily overlooked. Removal of the governor will give access to the resistance bank and to the complete dismantling. The leads from the field assembly will have to be unsoldered and marked beforehand.

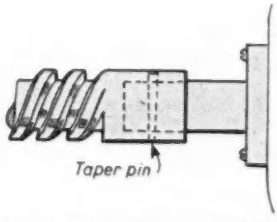


Fig. 9. Taper pin fixing that may be difficult to find

Leaving the tunnel assembly and considering again the general dismantling it will often be found that even with the bolts removed, the various sections will not come apart at all easily and the joints between the two portions may only appear, if at all, as a thin hairline. This is particularly the case when the body has

been machined or ground all over after assembly. It may be possible to part the sections by indirect means, such as by a mallet blow on the shaft end, but this is always a questionable procedure especially if the internal construc-

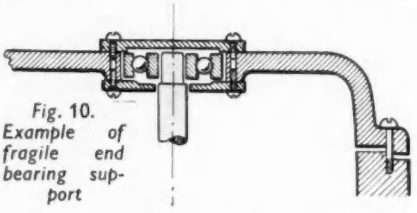


Fig. 10. Example of fragile end bearing support

tion is not known. If such a joint must be broken by direct means don't use a punch or chisel; try a knife blade.

Mincing and coffee grinding machines are good examples of this spot of bother and although they are only semi-portable tools, they nevertheless illustrate another method of fixing, say, a worm to the end of a shaft by a taper pin. See Fig 9. These often become rusted over after long service, even in an oil bath, and make their location difficult. These pins, frequently filed flush, can sometimes be found by cleaning the surface and applying a spot of acid. The pin may corrode to a different colour from that of the worm and so indicate its presence.

A very common assembly of portable tools is shown in Fig 10 where if the machine was correctly assembled in the first instance the removal of eight housing screws should permit easy dismantling. Unfortunately many machines have the bearings too tight a fit, both on the shaft and in the housing.

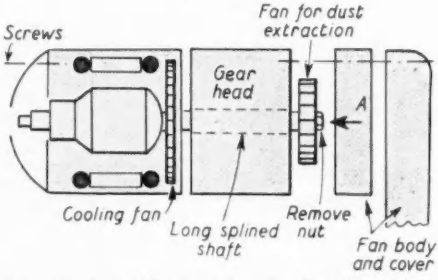


Fig. 11. Assembly requiring jig for dismantling

Fig. 10 had a cruciform end plate and was far too fragile to drive out a very tight bearing without risk. Let us consider an actual fault where the bearing, a two row self-aligning, had a split outer race which had become firmly fixed in the housing and also had the inner race too tight on the shaft to allow for extraction by a two jaw-puller spanning the cruciform end plate and engaging the bearing boss. The back plate (see Fig 10) was removed by drilling through the screw holes from the outside so allowing the whole armature assembly to be pressed through.

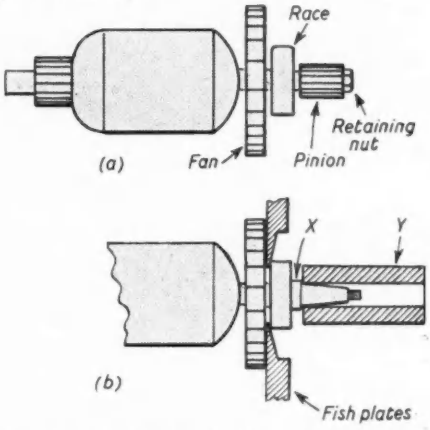


Fig. 12. Method of dealing with machine in Fig. 11

We can now cite a case where all the bolts have been removed and where all the several parts are discernible and quite loose and yet the whole assembly may not part. Fig 11 shows such an arrangement. This requires the shaft to be drifted through at A. With a correct jig to hold the assembly, the shaft could be pressed through quite easily. Generally speaking dismantling parts by pressure is one of the snags for the maintenance man with limited equipment. So many parts, forced together, will part readily with the correct puller or press and be so difficult when drifted with a mallet or copper hammer. This is especially true of the portable tool where the body metal is so often of aluminium and ball races and spigots are so apt to "pick up" metal and "bite" in.

Fig 12 illustrates at (*a*) the assembly as removed from the housing and (*b*) the bare shaft with the race and fan in their positions. It is just possible to use the normal press fish plates behind the pinion but the thread for the retaining nut is so slender (approximately $\frac{3}{16}$ in.) that it will not withstand a pressure sufficient to remove the pinion, if at all tight, without damage. Once this pinion has been removed the ball race can be tackled but pressure should be applied not to the screwed end but to the shoulder of the taper at X using a jig Y with a suitable hole. This jig is merely a steel bar.

(*To be continued*)

Our readers' views ...

A Policy for Fuel

WHILST realising I may well be drawing out the controversy regarding fuel policy, I feel I must enter the lists if only to carry my lance in support of what are usually called all-night-burning fires, already backed by T. J. Barfield.

A fire of this type, *properly installed*, definitely saves fuel. For this reason the fires are free of purchase tax. My wife's enthusiasm on account of both cleanliness and efficiency led me to install a second fire within a few weeks.

The views expressed by Mary E. Byrne, especially her preference for an electric fire, lead me to one of the following conclusions:—

(*a*) She is not the housewife.
(*b*) If she is, then she is probably away from home during the day.
(*c*) She does not like housework, or
(*d*) She has no soul.

An electric fire only! Ugh!!

L. Giltrow

TWICKENHAM

◆ ◆ ◆

Reactor Starting

WITH reference to Mr. A. N. D. Kerr's letter in your issue of May 22, I feel sure that Mr. Griffin (who is at present not in this country) would wish me to thank Mr. Kerr on his behalf for the comments made on Mr. Griffin's article on reactor starting.

It is true, of course, that an unduly low line voltage may reduce the starting torque of a reactor-started machine to a value insufficient to overcome the static friction of the drive, but this deficiency is common to all forms of reduced-voltage starting, and is not peculiar to the reactor-started machine. Indeed, unless an appropriate margin is allowed, it is perfectly possible for this starting torque deficiency to occur with a low-starting-current direct-on-line-started motor.

Regarding direct-on starting, the 5 h.p. limit mentioned by Mr. Kerr is far too low; in suitable circumstances machines of several thousand horse-power can be quite safely switched directly on to the supply, and even in quite ordinary industrial establishments motors of several hundred horse-power can usually be direct-switched without any ill effects. In these days of large inter-connected supply systems the present-day restrictions on starting current are (as was suggested by my colleague in his article) largely unnecessary, and a more enlightened and progressive attitude on the part of the supply authorities is urgently needed. The existing arbitrary limits are often supremely illogical, and cases are on record of permission to direct-switch small motors being refused when the standstill current of the motors is well under the normal running current of larger wound-rotor motors on the same feeder! In any case, the correct criterion is not the motor output in horsepower, but its *starting kVA per horsepower*; the existing regulations frequently make no concession whatever to the user willing to install a special low-starting-current machine, and the time for a high-level review of this subject is long since overdue.

D. R. N. Seed

ESSEX

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Lighting Installations in Churches

IN his article on the above, "Megohm" apparently thinks that the Central Council for the Care of Churches have gone too far in suggesting the use of solid drawn galvanised conduit for wiring in churches.

Having seen numberless cases of amateur addition to church lighting installations, I would say that solid drawn conduit is the only system that should be allowed in churches.

Quite recently I was called to the church I attend, as a number of lights had gone out, and found that the wiring was run behind oak panelling. On further investigation, I found that the whole of the wiring to these lamps was twin twisted flex, with dry twisted joints in it. Later, I inspected the lighting in a dark corner and was then asked to remove some wall brackets. I found that the main wiring was twin tough rubber with a metal joint box below each bracket. From these joint boxes, a piece of twin twisted flex went to the bracket and this flex was cemented into the wall.

The Central Council for the Care of Churches should have the power to demand a certificate of inspection and testing from all churches at least once every two years.

The question of earth continuity tests in

churches is one full of problems. With almost any type of lighting the conduit will usually end in a very inaccessible place. This will make earth continuity testing most expensive if it is to be done properly from the end of all conduit runs right home to the earth connection. In churches there is very little metal that would become "live" in the event of a fault in a piece of conduit that was not earthed, and well made conduit joints should retain their continuity for the life of the cables.

Another point is that many so-called "continuity testing sets" are useless, due to the very small currents they use.

If the Council for the Care of Churches could demand regular reports on church wiring installations, it would be a big step forward in their object to protect these buildings, even if the reports were only based on a visual inspection and insulation tests: always provided, of course, that the right type of person is employed on this work.

SUNDERLAND

R. D. Holt
A.M.I.E.E.

MINING IN 1951

DURING its operations in the calendar year 1951, the National Coal Board raised 211·9 m tons of deep-mined coal with an operating profit of £21·2 m. There was some return (£2·8 m) from the other activities of the Board, but after various outgoings were allowed for, including a loss of £5·5 m on imported coal, the Board had a net surplus on the year of £1·8 m.

Behind this bald summary of the N.C.B. report, which was published last week (H.M.S.O., price 8s. 6d.), there is a story of engineering efforts made in many directions to step up output and improve efficiency of working. An example of particular electrical interest arises in connection with colliery power generation. About 10 m tons of coal are used every year to meet energy requirements at collieries. In the long run, steam will be replaced by electricity. Between 1947 and 1951, electric motors used at mines increased in number by 27% and in horsepower by 18%. During 1951, 131 lb of coal were consumed for every ton mined.

Generation of the necessary electricity is likely to be carried out in pit-head power stations using fuel inferior even to that supplied to the B.E.A. Since the colliery load and the station output capability will not always balance, discussions have been proceeding with the B.E.A. for an interchange scheme with the National Grid. Both the N.C.B. and the B.E.A. are to build pit-head stations, and the first, at the Baronry Colliery in Scotland, is to be put in hand at once by the Authority.

Electricity plays many parts underground, one of the most important being connected with transport. Apart from the many electric motors used for haulage and on conveyors, there are some 60 battery-electric locomotives in use. During 1951 the Board designed a testing station for these and diesel units, and this is to be built as soon as a suitable site is found. An experimental trolley locomotive installation is being designed for the Sandhole Colliery in the North-Western Division. For the purpose of this experiment, the Chief Inspector of Mines has granted an exemption from the electricity regulations that prohibit this practice.

Mains lighting in pit roadways increased during 1951, and by the end of the year it was one-third greater than in 1947. The use of fluorescent lamps for coal-face illumination was extended, and at the end of the year a large-scale experiment with this type of fitting was almost ready to start at the Birch Coppice Colliery in Warwickshire.

An example of the way in which methane, a potential danger in a mine, may be used was given at the Point of Ayr Colliery in North Wales. By the end of 1951 all six boilers here were being fired by burning this gas, which was obtained from the seams. Experiments were proceeding, using different methods of achieving the same end, at seven other collieries.

Sales

Once again the electricity industry was the greatest single user of coal, taking 35·6 m tons out of a total inland consumption of 209·2 m tons. Gas works fired 27·7 m tons and coke ovens 23·5 m. Merchants' disposals (most of which goes to domestic consumers) totalled 32·4 m tons, and miners' coal, 5·1 m. It is noteworthy that of the total of 205·8 m tons disposed of, if bunkers are included, 64·4 m tons was large coal, 16·5 m tons treated smalls, and 19·0 m tons untreated smalls. Large coal was in much demand for exports.

American coal imported totalled 1·19 m tons, of which 0·85 m tons went to power stations. The average landed cost of this imported coal was £7 0s. 6d./ton.

DE-SALTING WATER

Low Cost Process Uses Synthetic Membranes

by H. W. PERRY

DE-SALTING of water for municipal and irrigation uses and removal of minerals from liquids in industrial production are now economically possible by a process developed by Ionics Incorporated, of Massachusetts, U.S.A. It was demonstrated early this year before representatives of the Government, industry and the Press.

The process requires electrical energy and makes use of continuous lengths of special ion-selective film or membrane usually 0·01 in. to 0·04 in. thick, made chiefly from coal-tar and petroleum chemicals and marketed by the company under the registered trade mark Permionic. It is expected to prove of prime worth in arid areas which are dependent upon irrigation for increased agricultural production, and where only sea water or brackish well water is available. It can be applied, however, also for purification of organic compounds such as milk, glycerine and sugar, and for recovery of valuable metals and chemicals from industrial waste streams.

Cost of operating the ion-exchange process, which is continuous, is stated to be one-third to one-half that by the evaporation and condensation method, the most economical process now commercially available and in use. This relative economy results from the fact that the Permionic membranes remove the salt and other minerals from the water whereas the evaporisation-condensation process removes the very large volume of water from the minerals and requires the expenditure of great quantities of energy. Moreover, the purification of brackish water costs less than the de-salting of sea water because of the lower content of salt and minerals.

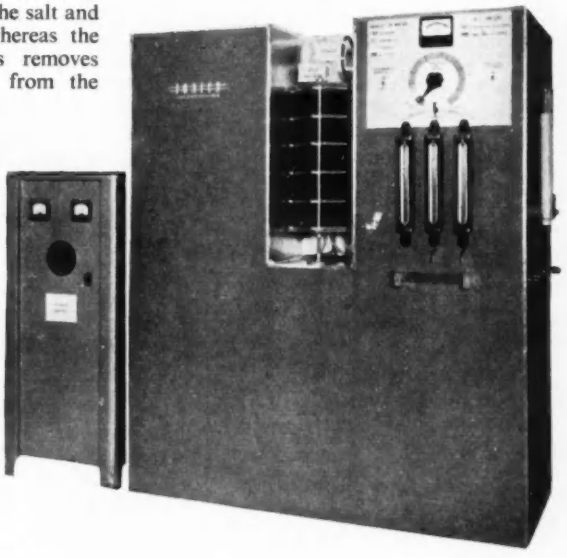
Operating units needed for the process will be made of basically inexpensive materials and can be mass-produced at moderate cost for assembly of a number of units together for large-scale operations. No chemical action has been discovered which might cause rapid deterioration of the components with use.

In operation, a stream of sea water or brackish well water is pumped into the unit, flows over the synthetic ion-exchange film and is discharged in two streams—one of two-thirds the volume of the feed stream and containing virtually no salt, and the other a stream of one-third the feed volume and containing practically all the salt. If desired, the brine may be treated to recover the salt, magnesium or other chemicals. Water-pumping cost is small and no heat or additive chemicals are used.

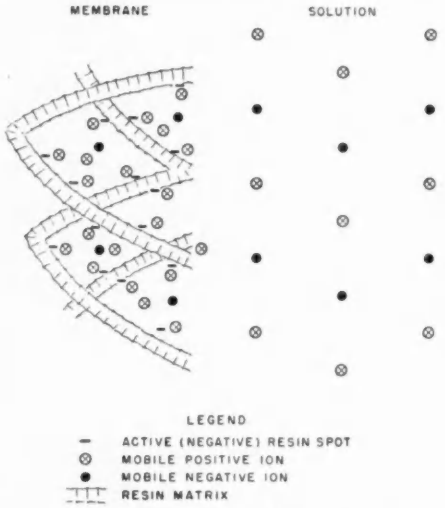
Active Material

The only active, replaceable material used is the membranes, which are the essential element required for the method. They combine properties of high electrolytic conductance, ion selectivity and hydraulic resistance. They can be produced in quantity at low cost, have good mechanical stability and long life. In industrial applications they offer advantages over the present use of ion-exchange synthetic-resin granules through which liquids are percolated in towers. Operation does not need to be stopped frequently to wash and reactivate the

Fig. 1. An exchange unit for purifying water



ion-exchange bed with corrosive chemicals such as sulphuric acid and caustic soda, and the processing equipment is much smaller and simpler. Hence purification of liquids can be done, it is claimed, at one-tenth to one-half the cost entailed by the resin-granule method.



Basic structure of the active membrane

Electric energy consumption is the major item of expense. An operating unit, as illustrated herewith, can purify sea water during a wide range of flow rates if electrical energy is increased with increase of the water flow, but the cost for current per gallon of de-salted water rises at a faster rate than the increase in water flow. Energy consumption can be as low as 20 kilowatt-hours per 1,000 U.S. gallons at relatively low flow rates. The less the content of salt and minerals in the water is, the lower the cost for consumption of current will be.

Costs

The cost for energy in purifying water having a salt contamination of one-tenth to one-fifth that of sea water may be as low as 1 cent per 1,000 gallons, depending upon the local cost of electric power. This makes the process attractive for areas where well water is made brackish by intrusion of sea water or oil-well brines or by percolation of surface water through soil and rock containing soluble minerals.

Lack of large quantities of low-cost electrical energy in many areas of the world is thought to be the greatest obstacle to widespread use of the Permionic membrane de-mineralisation process. One to 4 kW of installed plant are required to de-salt 1,000 U.S. gallons of sea water per day. To supply fresh water to a city of 100,000 population might require a power installation with a capacity of 10,000 to 40,000 kW.

Engineers believe that lowest costs of de-mineralising sea water will be realised in installations supplying more than one million gallons of fresh water per day. Their estimates are in American currency and United States gallons. It is thought that with electrical energy available at a rate of 0·3 cent per kilowatt-hour, the total cost, including a charge for amortisation of investment and maintenance of equipment, would be as low as 15 to 20 cents per 1,000 gallons, or $50 to $65 per acre-foot. If the cost of current were 1 cent per kilowatt-hour, the total operating expense would be 25 to 35 cents per 1,000 gallons, or $80 to $110 per acre-foot. But if brackish water is available instead of sea water, as in most arid areas, drinking and irrigation water could be supplied at 3 to 10 cents per 1,000 gallons, or $10 to $35 per acre-foot, provided energy is available at 0·3 cent per kilowatt.

Availabili'y

The company probably will not have its operating units available for general sale until the latter part of 1953. The interim is to be devoted to field testing of medium-size units of various types. It intends to design, construct and install a number of prototypes for testing in various applications under skilled supervision with the co-operation of selected organisations. Thus, operating data can be obtained quickly and the most suitable and economical units of larger size can be designed. When problems of mass production have been solved, it plans to start construction of large plants suitable for municipal and irrigation purposes. With quantity production of units, their cost is expected to be reduced very substantially. Units suitable for individual farm or home use probably will not become available, however, for more than two years.

For these reasons, the company now has no representatives or distributors in any other cities than Cambridge, Massachusetts, but looks forward to appointing some later and will be pleased to correspond with companies abroad who may be interested in the manufacture and distribution of the equipment or its components. The company was founded in 1948 by the American Research and Development Corporation.

An important anticipated future use of Permionic membrane is by biological and medical researchers, who have sought for a long time an artificial ion-selective membrane suitable for simulating body tissues for making measurements outside the body and applying them to study of basic life processes. Animal tissues, such as those of the lungs, intestinal tract, kidneys and nerves, are unsatisfactory for research because they lack strength, are difficult to prepare, and their characteristics cannot be reproduced accurately. The synthetic membrane, on the contrary, is strong enough to withstand handling in any size, has a simple structure, its characteristics are easily reproducible, and it is readily available.

Operation of the Membrane

The basic structure of the membrane, illustrated in a simplified diagram of a molecular model with the membrane immersed in a solution, has been described as a three-dimensional fish net. Interstices of the net contain water, and active charged spots are bound into the structure at various places. The spots in an anion membrane carry a positive charge; those in a cation membrane, as pictured, have a negative charge. Each active spot is countered by an ion of opposite sign which is somewhat mobile and is dissolved in the water in the membrane.

Whenever a cation membrane is in contact with a salt solution, an exchange of positive ions occurs between the solution and the membrane. But the negative charges of the membrane cannot move, so they hold in the structure a number of positive ions equal to the number of negative charges. A cation membrane has high selectivity for positive ions because within the membrane they are always present in excess of the number of mobile negative ions.

Standards at the N.P.L.

ACCURATE measurement, and its associated problem of the development of standards, is the prime duty of the National Physical Laboratory, and its activities in this field have been the subject of many highly technical papers to learned institutions. For the engineer whose interests are not in precise details there is much valuable information in a series of publications recently issued by H.M. Stationery Office under the title "Units and standards of measurement employed at the National Physical Laboratory."

Electrical Standards

That of most immediate interest to our readers is the third pamphlet in the series, which deals with electrical standards. It recalls that throughout all the years of development, certain broad principles first laid down by a committee of the British Association in 1863 have been accepted. They formed the basis for the conclusions of an international gathering which in 1908 laid down fundamental values of the ohm, amp, volt and watt in terms of the centimetre, gramme and second.

Physical standards, as distinct from definitions, were developed by the N.P.L., but these were found to be little easier of reproduction than the absolute values. As a consequence, a committee advised in 1929 that the absolute system should replace the international system, though it was not until 1948 that this change could be carried through.

After relating this history in some considerable detail, the pamphlet turns to a description of the apparatus used by the N.P.L. in the determination of standards. The equipment described ranges in complexity from the Ayrton-Jones current balance used in the determination of the absolute ampere, and the Lorenz machine that plays its part in the corresponding resistance measurement, to the legal standards, three of which (for resistance, current and voltage) were approved by an Order in Council in 1894. In the absolute measurements, accuracy to a few parts per million is expected, but in contrast the legal standards claim only 0·01% accuracy for the ohm, and 0·1% for the other legal units.

For practical purposes, reference and working standards are maintained, with accuracy, for the purpose of comparison one to another of the order one part in a million.

Illumination

The second pamphlet of the series has light as its subject. In this case there is no general history, but the pamphlet does provide useful information in regard to the Laboratory's practice in regard to photometry, colorimetry and radiometry. In particular, there are valuable if brief discussions of equivalent luminance and of colour temperature which are of particular interest in relation to illumination problems.

Both pamphlets are obtainable from H.M.S.O., No. 2 price 6d. and No. 3 at 9d.

PROTESTS FROM E.T.U.

PROTESTS at the number of non-unionists who, it was stated, received benefits of trade union agreements, were made by delegates at the annual policy conference of the Electrical Trades Unions at Eastbourne last week. They decided on a vigorous membership recruiting campaign, where desirable in conjunction with other unions, and enforcement of the closed shop principle wherever possible. Other motions which were carried urged greater participation by the workers in the control and administration of nationalised industries, and expressed concern at the current policy of reducing expenditure on education, public works, and essential services.

The question of wages was also discussed at some length, mainly around a motion urging the Executive to press with the utmost vigour for increased wages. Moving this motion on behalf of the Executive, Mr. Walter Stevens, general secretary of the Union, stated that if strike action were the only ultimate method of maintaining and improving their standard of living they would receive the maximum support. But the conference later decided not to press for sliding-scale wage agreements based on the cost of living index.

A resolution protesting against what were termed slanderous Press statements about meter readers employed by the London Electricity Board was also approved. This resolution noted that in spite of the fact that both sides of the negotiating machinery for the Industry deprecated such Press statements the campaign had continued. One delegate said that since they went back to work after being on strike many of these meter readers had been insulted by consumers.

Mr. Frank Foulkes, president, announced on Friday that a writ had been issued by Rival Lamps Ltd. against the A.E.U. and the E.T.U. and two shop stewards, the latter being accused of inducing members to break their contracts.

Power Round the World

ELECTRICITY is a form of power always closely connected with industrial productivity. It is no surprise, therefore, to find spaced throughout "World Economic Report, 1950-51," a comprehensive survey produced by U.N.E.S.C.O., many references to electrical development. Particularly interesting are those figures which apply to the Eastern European and Asian countries from which comparatively little is usually heard.

Of the U.S.S.R., for example, the report notes that the five-year plan beginning in 1945 and ending in 1951 was largely fulfilled Indeed, in regard to heavy industries and to electricity it was over-fulfilled, in some cases because of higher employment than had been intended. For electric power the target was 170% of the 1940 output, but the realised ratio was 187%. Electrical appliances figure in a list of goods in which a big increase in output is claimed.

No subsequent five-year plan has been announced by the Union, but various specific development plans have been made public, and amongst these is one for the construction by 1957 of three hydro-electric stations. These are to have an output which is described as amounting to 25% of the total 1950 production.

Roumania, Czechoslovakia and Hungary all have ambitious five-year plans, that aim at raising industrial production to 244% of the 1950 level, 198% of the 1948 level and 310% of the 1949 level respectively. Inevitably, increased electrification will be part of the work to be carried out. Yugoslavia's corresponding plans suffered a set-back as a result of political events, and the progress that was achieved was unevenly divided between various industries. Heavy industry and electric power were instances of sectors in which achievements remained far below planned levels.

China

In China, the last of the "centrally planned economics" discussed in the report, the 1950-51 period was occupied with an expansion in the scope of economic planning and of the nationalisation programme for industry and trade. At mid-1951, it was estimated that 75% of the electricity industry and 72% of the coal industry in "centrally planned China" was owned and operated by the government. Production of electricity was up to 94% of the previously recorded peak year (believed to be 1936), after being only 72% in 1949. For coal the corresponding figures are 69% and 45%.

In Nationalist government-controlled Taiwan province, the output of electricity rose steadily, and reached 133% of the 1949 rate by the first half of 1951.

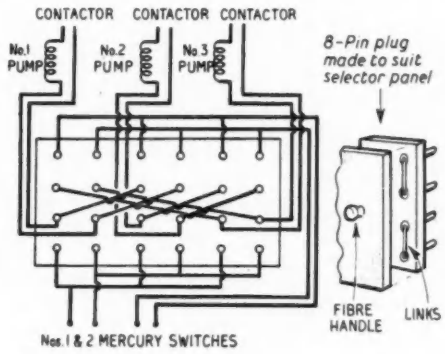
Problems and Practice

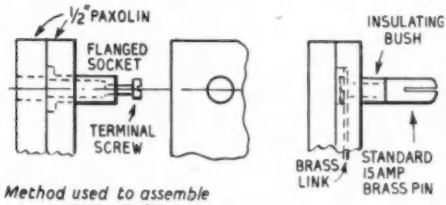
IN ENGINEERING

Changeover Plug and Sockets

RECENTLY I was asked to put a third additional standby pump on automatic control. There were already two existing pumps controlled by "No Flote" controls, each at differing levels so that should one machine fail or be unable to cope with demands, the second pump would come in also.

It was desirous that the two "No Flote" controls remain and that the circuit be so arranged that the pumps could be changed around so that any one of three pumps would be out of service for maintenance, etc. Furthermore, the controls were to be connected so that the pumps could be changed in turn from one operating level to the other. This was effected by making up a special eight-pin plug to fit into any one set of three eight-pin sockets as per the attached sketches.





Changeover plug and pump control connections

The "No Flote" circuit itself is not included as I assume it is generally known to users.

The sockets were made so that the metal parts are recessed and adequately protected, and the pins used were as standard in a 15 amp plug. It is practically foolproof and can be suitably mounted in a metal box with provision for proper conduit entry, and a lock and key for use of authorised persons only.—*W.D.*

Remote-Controlled Starters

THE notes on remote-controlled starters (March 27 and May 15) describe conditions which arise only when fuses of incorrect size are fitted in the motor circuit. Your contributor "J.G." includes this condition by saying "in the event of heavy fuses being fitted," and "W.J.C.'s" example describes an instance where the fuses refused to melt when the motor was taking six or seven times full-load current, which is a normal stalling value. The proposition seems to be, therefore, that the advantages of self-resetting overloads should be sacrificed to the electrician's incompetence in being unable to estimate the correct size of fuse, or his omission to do so.—*R.A.*

Motors Losing Speed

IN the days before interpoles became common, it was usual to move the brushes from the neutral point to obtain sparkless commutation and speed regulation. To a certain extent it did this at starting and light loads, but was unstable on heavy loads and load changes. They lost speed and blew fuses. With the use of interpoles such faults became non-existent except if the interpole winding became weak. This could easily occur if some of the turns of any coil became by-passed, as could happen as the insulation needed between turns was not great. The insulation resistance and resistance of the windings should be tested when the motor is cold, and again when hot after a run. Any great variation in the readings will denote a fault.—*W.E.W.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

MECHANICAL HANDLING

—*the KEY to PRODUCTIVITY*

3rd CONVENTION AND EXHIBITION OPENED AT OLYMPIA, LONDON, BY THE MINISTER OF LABOUR

"GREATER output at lower cost" is the theme of the Third Mechanical Handling Exhibition and Convention which opened at Olympia, London, yesterday for ten days.

To judge from the many fine examples of this specialist industry on view and to appreciate the time and labour-saving features inherent in their design, it is obvious that this country cannot for long lag behind our transatlantic contemporaries in achieving a higher degree of mechanisation for fuller productivity.

The exhibition quite naturally has full Governmental commendation and approval, judging from the remarks made by the President of the Board of Trade, Mr. Peter Thorneycroft, M.P., when addressing industrialists both at home and abroad, and the acceptance by the Minister of Labour, Sir Walter Monckton, Q.C., M.P., of the invitation to perform the official opening ceremony.

Full credit must go to the organisers of the exhibition, *Mechanical Handling* of the Associated Iliffe Press, for the excellent way in which such a wide range of equipment has been presented.

Quite naturally in view of the convenience and efficiency of electricity as prime source of power, visitors to the show will find a wide range of electrical equipment for the power units and control of the machinery apparent in all sections of the show.

Conveyors

"Sherwen" vibratory conveying equipment is shown by FRASER AND CHALMERS ENGINEERING WORKS of the GENERAL ELECTRIC CO., LTD. The central feature of the stand is a circular, electromagnetically operated vibrating trough or picking table, which has been made up into a screening unit. This separates a mixture of granules into three groups by size. These are then fed to a spiral elevator by further vibratory conveyors arranged as spokes to the hub formed by the elevator. This elevator then elevates the material, and from the top of the spiral it is finally returned for recirculation.

MAVOR AND COULSON, LTD. show a length of their sectional belt conveyor running. The idler rollers are carried on inverted troughs, joined by angle feet, making a light yet rigid structure.

Lifting and conveying equipment designed for both internal and external use, particularly adapted for the textile industry, with a full size working model of battery "Canveyor" which can operate as a shuttle service between processes is featured in the display of J. AND H. LOWE (Cranes).

Overhead chain conveying systems, including working new light type power-pulled and dual-duty conveyors, a working floor conveyor and a working range of electric chain pulley blocks are displayed by GEO. W. KING, LTD.

The Four-ways portable conveyors by FOUR-WAYS (ENGINEERS), LTD., on view, handle units up to 3 cwt. from ground level to delivery heights ranging from 3 ft 6 in. to 26 ft. handling a varying tonnage of from 40 to 70 tons/hr.

RICHARD SUTCLIFFE, LTD., show "Tigress" two-drum driving head, 50 h.p.; cage-type raffing roller for cleaning belts and "Hammock" idler. Also on view is "Goliath 6" driving head, complete with fluid coupling. It is powered by one of the Laurence Scott "Trislot" motors.

A moving belt conveyor fitted with a Pitmaster Belt, and carrying coal in a setting which is intended to convey the illusion of a colliery roadway, is featured at the BRITISH TYRE AND RUBBER CO.'s stand.

Electric Trucks, etc.

Showing on the stand of I.T.D. LTD., is the ELECTRICAR model TLS, a popular electric platform truck of the elevated platform type; also model TU. 40BA capable of carrying two tons. Particularly interesting are the battery changing trolleys which are demonstrated daily.

LANSING BAGNALL, LTD. show the PF20/20T pedestrian-controlled fork lift truck which will allow a 1-ton load to be lifted at 20-in. load centres. The new model is available as a single or telescopic fork lift truck. Whilst RANSOMES, SIMS AND JEFFERIES, LTD., pioneers of electric vehicles, have displayed a battery-operated fork truck, arranged with 8-ft lift and 5-ft 11-in. lowered height (capacity 10 cwt at 15 in. centres with ancillary equipment), a battery-operated fork truck, arranged with 10-ft lift and lowered height of 7 ft 4½ in., amongst other exhibits.

"A sturdy, compact and extremely mobile unit" is the description by WINGROVE AND ROGERS, LTD., of the Type DH 23 1-ton electric fork truck with 12-ft lift they have on show.

Battery electric models of pallet-lifting, moving and stacking equipment are to be seen at the stand of MATLING, LTD., together with mains electric pallet trucks and stackers.

BRUSH COACHWORK, LTD. are showing high and low loader battery electric vehicles with elevating platforms. One of the trucks on show incorporates the firm's newly developed automatic brake and control.

WILLIAM MOSS AND SONS, LTD. (Mechanical Developments Division), feature their mobile hydraulic working platform considered to be ideal for serving lights, fittings and anything overhead in factories, stores, warehouses, etc. It has been described in the ELECTRICAL TIMES under the trade name of "Beanstalk."

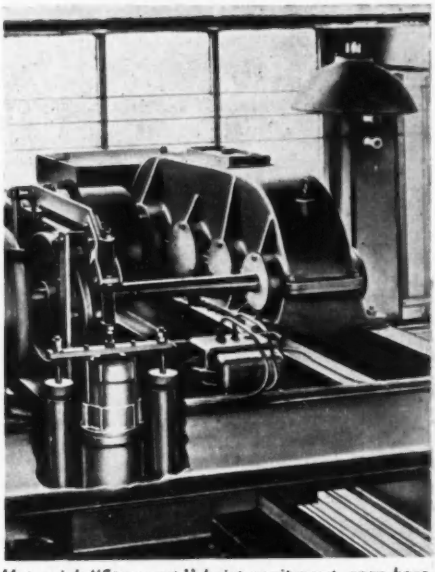
STEEL'S ENGINEERING PRODUCTS' stand proudly presents the Coles "Electric Eel" tractor (Model 52698), battery-electric with a maximum drawbar pull of 4,000 lbs. This is the latest addition to the "Electric Eel" range.

Cranes, Grabs, Hoists, etc.

Shown for the first time at a Mechanical Handling Exhibition is the new Jones KL 66 designed to meet the requirements of high speed for grabbing or operating with a magnet, and a great sensitivity of control for handling fragile merchandise and for the accurate placing of constructional units in building. It is of course displayed by GEORGE COHEN SONS AND CO., LTD. (The "600" Group of Companies).

A 10-ton three-motor heavy-duty, cage-controlled overhead electric travelling crane will be shown. THE WHARTON CRANE AND HOIST CO., LTD. (this incorporates METROPOLITAN-VICKERS Staycreep hoist control equipment) believe it is the first time anybody has exhibited a fully motorized heavy-duty overhead electric travelling crane with cage control.

The main exhibit of INTERNATIONAL COMBUSTION, LTD., is a standard Beaumont skip hoist with a skip bucket of 40 cu. ft capacity and an 18 by 24-in. Simplex loader. The bucket runs up an inclined track, tips, returns to bottom position where the loader operates automatically and, after a pre-determined interval (for filling), the bucket again ascends, disengaging and automatically closing the loader.



Metrovick "Staycreep" hoist equipment, seen here on a Wharton overhead crane mechanism ensures accurate mechanical handling.

A two-station electric travelling hoist is a feature on view on the stand of FÉLCO HOISTS, LTD., whilst shown by ASEA ELECTRIC, LTD. are a range of standard Asea pulley blocks from 5-cwt to 2-ton capacity. Some of these are provided with "inching" or creeping adjustment and with various types of suspension.

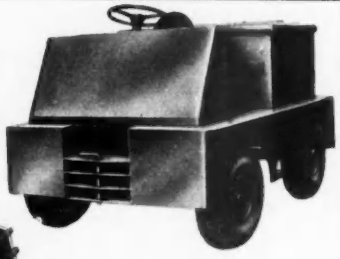
A triple-type spur gear pulley block, with hook suspension and also a built-in type in rigid and flexible trolleys, for use on R.S.J. runway beam, is shown by JOHN BARNSLEY AND SONS, LTD. In addition is a full range of the firm's standard range of lifting and handling equipment, the main exhibit being a new "Barnsley" electric overhead travelling crane crab.

The range of electric hoist blocks of various capacities shown by AABACAS ENGINEERING CO., LTD. includes an overhead electric travelling and gravity lowering gear for electric hoists.

A battery-operated stacking crane shown by J. W. FLOWERS AND CO. (ENGINEERS), LTD., is a new departure from the firm's original electric crane. A churn tipper for milk churns is also shown. Up to 360 churns of varying sizes and shapes can be emptied in one hour by one operator.

Above: Tubular steel stillages with slat decks. Shown by Tubewrights Ltd.

Right: This Electric Eel Tractor shown by Steel's Engineering Products has a 4,000 lbs. drawbar pull



Left: A sectional view of the power tracking made by A.S.E.A. Electric Ltd.

Below: The Goliath 6 driving head for a conveyor system shown by Richard Sutcliffe Ltd., of Wakefield, incorporates a "Trislot" motor

Right: This electric battery "Canveyor" shown by J. and H. Lane (Cranes) Ltd. makes light work for the operatives

BUTTERS BROS. AND CO., LTD. show a 3-ton electric worm-geared winch. The winch is a working unit and can be seen in operation.

A hoist block claimed to be eminently suitable for all forms of precision handling is exhibited by the VAUGHAN CRANE CO., LTD. It is a one-ton electric hoist block, fitted with full variable-speed control in hoisting and lowering directions, using a motor incorporating eddy current slip coupling. The Vaughan "Vestrad" radio control unit for overhead cranes is shown in a re-designed form.

Motors, Gearing and Control Gear

ENGLISH ELECTRIC CO., LTD. are showing a range of L.Y. totally enclosed fan-cooled, squirrel-cage motors which comply with draft British Standard CON(ELE) 6814. These motors are suitable for driving conveyors, elevators, stackers and pumps, especially in dusty and dirty surroundings.

A wide range of electrical equipment for application to all forms of mechanical handling is being shown by the BRITISH THOMSON-HOUSTON CO., LTD. (Grand Hall, stand E1a). Various types of electric motors and a photo-electric counter and a range of electronic timers are also on view.

The main METROVICK exhibits are the new type KNB t.e.f.c. squirrel-cage motors with standardized fixing dimensions to the American N.E.M.A. specification; the new type MDX steelworks auxiliary motor which conforms to the A.I.S.E. 600 series; and an AC Perigrip brake demonstration unit.

Latest addition to the range of NEWMAN INDUSTRIES, LTD., is the industrial-type motor with outputs from 20 h.p. to 200 h.p. This range is represented on the stand by two motors of the slip-ring, drip-proof type.

On the stand of TUDOR ACCUMULATOR CO., LTD., are shown various types of Tudor cell available for industrial application, whilst examples of D.P. Kathanode cells and battery units as fitted for traction purposes on electric factory trucks of the fixed platform, elevating platform,

fork lift and pedestrian type form the exhibit of D.P. BATTERY CO., LTD.

PARTRIDGE, WILSON & CO., LTD. (Grand Hall, stand D4) have on view the Davenset automatic battery-charging rectifier, together with rectifiers for injecting direct current into a.c. vibratory screens and conveyors, whilst principal exhibits on the stand of OLIVER PELL CONTROL, LTD., are a.c. solenoids, d.c. solenoids, custom wound coils and transformers up to 5 kVA. VARLEY MAGNET CO., incorporated with the firm, is showing a selection of batteries.

Gearboxes, including infinitely variable speed gears, electric hoist blocks, and a working example of a four-motor 5-ton creeping hoisting and creeping travelling crab, are featured by MATTERSON, LTD.

ELECTROPOWER GEARS, LTD. (Grand Hall, stand C4), exhibit for the first time their complete range of geared motors and speed reducers. Also shown is a completely new unit, having a maximum ratio in the region of 7,000 : 1.

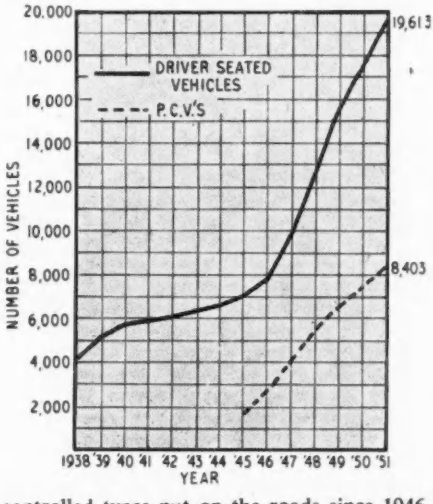
Pallets, stacking crates, stillages, an essential when using fork-lift trucks, a mobile truck with tug-lift, trays and various types of decking, all of welded tubular steel construction, on the stand of TUBEWRIGHTS, LTD., subsidiary of STEWARTS AND LLOYDS, LTD., have a great strength/weight ratio. Their rounded contours facilitate easy handling.

SIMON HANDLING ENGINEERS, LTD. have three of their main exhibits concerned with pneumatic handling, in which field the firm has long been prominent. There is a full-size vacuum pump of the type used in Simon plants, and a sectional model of the "John Anderson"—one of the two 300 tons/hr floating pneumatic grain-discharging plants recently built for the Port of London Authority.

TWO items of pneumatic equipment by WESTINGHOUSE BRAKE AND SIGNAL CO., LTD., demonstrated in the form of working models, are the Westinghouse Model 10 retarder and the Model 10 skotch block. Both are extensively used for controlling large tubs and mine cars.

Electric Vehicles More Popular

THE rapid expansion of the use of electric vehicles, since the war, is in large measure due to the increased activities of the Electric Vehicle Association of Great Britain, whose annual report, for 1951, just published, gives some details of the work undertaken in that direction. As our graph shows, there has been an increase of nearly 12,000 driver-seated electric vehicles and about 7,000 pedestrian



controlled types put on the roads since 1946, the totals for each of those classes of vehicle in use at the end of 1951, being 19,613 and 8,403 respectively. Statistics of registrations show that 1,156 electric vehicles were registered during 1951, of which total 476 were of 1-1½ ton carrying capacity. To this total must be added 844 vehicles exempted from Road Fund Licence, 781 pedestrian controlled vehicles and 339 invalid carriages, making a grand total of 3,120. Bearing in mind that pedestrian controlled vehicles (p.c.v.) have become exempt from "C" licence regulations, the Association has approached the Ministry of Transport to similarly exempt all battery electric vehicles, and the matter is still under discussion along with the proposal to abolish or modify purchase tax.

A new booklet entitled "The Electric Vehicle reduces local delivery and collection costs," was recently completed, and has been circulated to some 20,000 prospective electric vehicle users. In the latter part of 1951 also, a new scheme of advertising was adopted which has shown promising results. The activities of the Association were also prominent at various exhibitions during the year, notably the South Bank Exhibition, where all members of the E.V.A. showed a vehicle, on a rota basis, during the period of the exhibition; at the Dairy Show and at the International Bakers' and Confectioners' Exhibition. The conference of the Institute of Public Cleansing was the scene of further displays, and discussions on the question of the design and type of vehicles required.

In view of all this activity, it is perhaps not surprising that the accounts show a debit balance of £748 for the year.

PROGRESS— AT HARWELL

Reactor Design described in New Review of Progress

FIVE years of research at Harwell has brought much nearer the possibility of practical nuclear sources of power for industry. The story of the technical development successfully carried out during that time, together with the plans that have been made for the future, is told in a new Stationery Office publication.* For the electrical engineer it is a tale of undoubted interest for the future.

In its essentials, the problem of development of power sources is that of designing piles. Two of these—Gleep and Bepo—have been described many times in the columns of the technical Press. More recently Bepo has been used as a source of heat—a duty never intended in the original design. Experience gained in the operation of these experimental units was invaluable in designing the production piles now operating at Windscale.

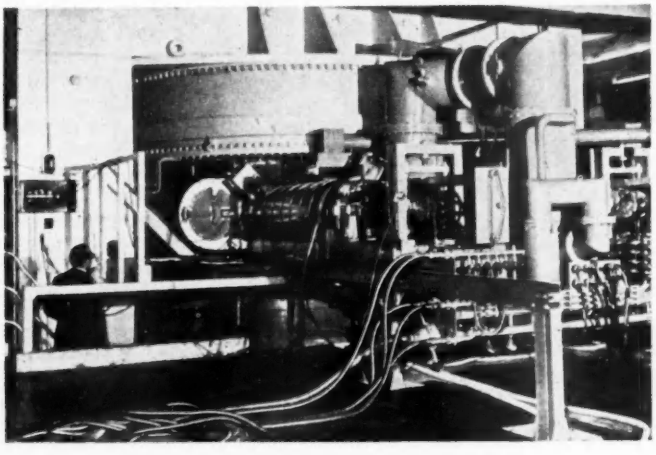
Reactor Development

Conventional electrical generating plant is likely to provide the only means of producing power from a reactor likely to succeed in the next decade. That is the opinion of the experts who have prepared this book. A development programme has therefore been drawn up for the purpose of deciding the best kind of reactor for this duty. Theoretical work came first, and on its results are based the design studies now proceeding at Harwell and in industry. To be practicable, the pile must operate at a high temperature. To be reasonably economic, the very costly reactor must have a long life assured, during which time operating costs should be low.

Three general classes of reactor have to be considered, classified as slow, intermediate and fast, the designation varying with the speeds of the neutrons causing fission. Gleep and Bepo are slow-fission reactors, and in these graphite is used as a moderator to slow down the neutrons. The use of moderators other than graphite (e.g. heavy water) would make the pile smaller, but no such reactor has yet been built capable of running at the desired high temperature.

Intermediate reactors are designed to take advantage of a favourable "resonance" range of speeds. They employ a moderator which need not be a very light material like carbon, and can thus be smaller in size than corresponding slow types. Fast-fission reactors

* "Harwell: The British Atomic Energy Research Establishment, 1946-51." Published by H.M. Stationery Office, 128 pages, 9¼ in. × 6 in. Price 6s.



The 110-in. Synchro-cyclotron at Harwell is seen here. A feeder line (the ribbed horizontal cylinder in the centre of the picture) leads into the vacuum chamber between the magnet pole pieces. The large vertical pipe on the right is part of a 20-in. vacuum pump

utilise neutrons moving at the high speeds with which they are born. No moderator is needed, and the fuel is likely to be greatly enriched uranium.

Reactor designs may be modified to allow breeding to take place. The reaction concerned may use as a fuel a mixture of U238 and plutonium, plutonium being produced in the pile, or else thorium 232, which produces U233.

Practical Designs

Now that Harwell has completed its initial theoretical study of reactor principles, design and feasibility studies are proceeding on three projects, two of the slow neutron type and the third using fast or intermediate neutrons. Most advanced is the design of a pile rather similar to Bepo, using a uranium enriched with the U235 isotope. This may work at a temperature as high as 600° C (1,112° F), its heat output being used for steam raising. Assuming that such a pile has an output of 10 MW, the radiation shield surrounding it will weigh some hundreds of tons. The charge might be 3½ metric tons of uranium metal, with the natural U235 contents quadrupled. Such a pilot plant could lead to the development of special forms of reactor for ship propulsion applications.

The other slow reactor being studied may have applications to electricity generation. However, the consumption of uranium in such a pile is likely to be high, and the economic practicability of it is closely connected with the development of relatively inexpensive methods of extracting uranium from the low grade ores that are available.

Breeding reactors avoid such difficulties, and it is with this in mind that the remaining reactor is being studied. The core of such a reactor would be small: perhaps only one or two feet in diameter, with a very high neutron flux. This small size complicates the problem of heat removal, and a closed circuit forced flow liquid metal coolant will probably have to be used.

An outstanding problem for all these designs is that of developing materials capable of maintaining their mechanical strength while operating at high temperatures and subjected to a heavy bombardment of neutrons and other radiations. For steam or gas turbine applications some coating other than aluminium will be required for the fuel elements, and beryllium and zirconium appear possible choices. Instead of canning, the fuel elements may be coated with the containing metal.

In connection with the use of molten metals for heat transfer, the interesting possibility exists of forcing them round the circuit by electromagnetic induction "pumps," having no moving parts.

General view of a pile control room

One of the most important investigations connected with reactor design is the study of the nuclear properties of materials. Energies up to 2 MeV may be required for this purpose, and so Harwell has of necessity a concentrated interest in particle accelerators.

For use at Harwell, two Van de Graaf generators are available, one a 5 MV model, and the other rated at 2 MV. Some trouble has been experienced with the design of an accelerator tube for the former machine, and investigations into this problem are now proceeding.

In the cyclic class, the largest accelerator installed is a 110-inch synchro-cyclotron. The frequency of the accelerating impulse in this machine is decreased from 26 to 20 Mc/s as a proton moves outwards in its spiral path and the final speed of the particle is about half that of light with an energy of nearly 180 MeV. A grounded grid oscillator supplying the r.f. voltage is formed from a 150 kW watercooled triode and a system of resonant coaxial transmission lines. It is a significant comment on the magnitude of the equipment that the inner conductor consists of a copper tube shrunk on to a modified 5-in. gun barrel.

For electron acceleration, Harwell has an interest in 30 MeV synchrotron made for the Medical Research Council, and a 300 MeV machine being constructed for the University of Glasgow. In the linear accelerator field there is a travelling wave machine which gives electrons with energies between 3·5 and 4 MeV, with a mean beam current of 100 microamps. A 10 MeV machine is being designed.

overseas news

Dollars for Plant

The New South Wales Government has asked Mr. Menzies, the Prime Minister, to earmark $20 million (£A8,930,500) for two generating plants out of any new dollar loan he raises in the U.S. during his current visit. The State Government wants the dollars to pay for two complete power units, each of about 70,000 kW capacity, which it could buy in the United States. While in America last year the Electricity Commissioner (Mr. Conde) opened negotiations for these two power units. The Government has received quotations, but cannot place the orders until it gets the dollars. All the site works are ready for these plants which would come from the Westinghouse and General Electric companies.

O.H. Line Order

An order, valued at £326,700 for cable and accessories for the 66 kV and 132 kV transmission lines for the Tully Falls hydro-electric project, Queensland, has been placed with Stewarts and Lloyds (Aust.) Pty. Ltd. and Australian General Electric Pty. Ltd.

T.V. Wanted

The Australian Government is to be asked to reconsider its decision to postpone television development plans. The Radio and Electrical Retailers' Council of Australia passed a resolution to this effect at its recent meeting. It is felt that it would be disastrous if trained television engineers should drift into other employment.

Softening the Blow

The Queensland State Government has now set up a sub-committee to discuss with departmental heads the most suitable methods of curtailing the State's works programme, in an effort to soften the cut in loan money from £30 million to £18 million. The sub-committee is to work out a priority system for public works. It is being suggested that the most drastic cuts would apply to the proposed electrification of the suburban section of Brisbane's State railways.

N.B. Investigation

The power sites now being surveyed along the St. John River total about 800,000 h.p., Mr. R. Tweeddale, power development engineer of the New Brunswick Electric Power Commission, revealed recently. Reports previously published, he said, had put the figure considerably higher, but these were in error. In addition to the figure he quoted, Mr. Tweeddale said the Grand Falls output could be stepped up considerably when water flow now going to waste was utilised. The potential energy that would be developed at Beechwood, he said, was 495 million kWh. It was later announced that the Federal Government is providing $120,000 this year to finance further investigation of the potentialities of the St. John River.

Newfoundland Development

To provide for future requirements, two water-power plants are being built on the Horse Chops River, 35 miles south of St. John's, by the Newfoundland Light and Power Co. One plant, with a capacity of 7,500 h.p., is expected to be in operation before the end of the year, while late in 1953 is set as the opening date for the other development, which will have a capacity of 10,000 h.p. As a protection against power shortages in dry years a 3,500 h.p. diesel plant is being installed in St. John's.

New Swedish Station

The Swedish Government has granted permission to the Kraangede concern to start the construction of a power station at Ramsele on the Fax River in the Province of Angermanland (North Sweden), at a cost of 72 million crowns.

New Station for Calcutta

The Calcutta Electric Supply Corpn. Ltd. has made preliminary arrangements for the construction of a new Southern power station, which was foreshadowed some years ago. Plans and preparations have already been prepared, and in collaboration with the consulting engineers, Merz and McLellan, it has been decided that a start should be made with the installation of one 30 MW machine and two boilers in the initial stage. The company has completed its new Cossipore power station (described in our February 9, 1950, issue) and extensions to the Malajore steam power station on the River Hooghly, and can now meet a maximum demand of 250 MW with margin to spare, but at the present rate of development it is estimated that load growth will overtake the generating capacity in 1956.

Testing Laboratory

At Karachi a few days ago, the Pakistan Minister of Industries officially opened the Central Testing and Standards Laboratory. He admitted that it was only a small beginning, but plans for a bigger Institution were under consideration. At present the Laboratory could test a fairly wide range of articles—steel products, metals and alloys, ores, chemicals, etc., he said.

400 kV Line

The possibility of establishing a 400 kV transmission line connecting Buenos Aires with the hydro-electric power resources which are to be developed in the Province of Mendoza, is still under consideration by the Argentine Government, we understand.

N.Z. Conference

Because there is a difference of opinion existing between the New Zealand Electricity Supply Authorities' Association and officers of the State Hydro-Electric Board concerning when power shortages would be overcome, there is likely to be a conference between representatives of the two organisations in the near future. Mr. C. S. Lovegrove, chairman of the Association, recently aired the matter when he said that the Department had claimed 1952 would see the end of rationing. But engineers of the association contended that the years 1955 and 1957 would see another serious power crisis unless some alternative or additional means of generation were found, he stated. So the Minister of Works, Mr. Goosman, has suggested a conference to iron out the matter.

Hutt Valley Railways

Electric trains are expected to be operating on the Wellington-Taita line later next year, and extended to Upper Hutt towards the end of 1954, but this schedule depends upon the prompt delivery of materials. Electric power for the new service will probably be available from Haywards in 1953, the general manager of the State Hydro-Electric Department, Mr. Davenport, stated a few days ago.

Roxburgh Dates

The contract proposed to be entered into for the completion of Roxburgh hydro-electric scheme in the South Island, N.Z., sets a target date of July, 1955, for two 40,000 kW generators to be in operation, and a substantial bonus is offered to that end, according to the Minister of Works, the Hon. W. S. Goosman. He was referring to certain local press reports which inferred differently. He stressed that the plant had been on order since the middle of 1950, the generators being supplied by the B.T.H. Co., and the turbines by the Dominion Engineering Co. of Canada. Delivery dates begin at the end of 1952 and extend until March, 1954. There was every reason to believe that the target date, both for the power station and the transmission lines and outstations, would be adhered to.

Every Little Helps

Feeling that there might be power potentialities in its own area, the Auckland Electric Power Board has set up a committee to investigate the possibility of small hydro-electric power schemes. It is suggested that plants of about 100 kW to 150 kW capacity might be set up in the hills around Clevedon. At the Board meeting doubt was expressed as to the economic feasibility of such schemes, and it was also pointed out that under the Government regulations the power generated in this way would have to be fed into the North Island grid.

Jo'burg Orders

Orders for the main plant for the new Kelvin power station of the Johannesburg City Council have now been placed with the General Electric Co., Ltd., and Babcock and Wilcox, Ltd. it was revealed by an official last week. The former is to supply three 30-MW turbo-generators, while B. and W. are to manufacture the associated boiler plant. The preliminaries to these orders were settled during the recent visit here of Mr. J. C. Fraser, general manager and chief engineer, Mr. G. B. Gordon, chairman of the Johannesburg City Council Finance Committee, and Dr. L. Q. Holmes, city treasurer, whose recent arrival in this country for the purpose we exclusively noted in our April 17 issue. Before returning to South Africa last Thursday, Mr. Gordon said that the new Kelvin power station should be in commercial operation by 1955. All the equipment had been ordered from Britain, he added. This new station is to be erected at Lombardy Estate, north-east of the city. In its initial stage it will have a capacity of 90 MW, but under present plans it is likely that a similar sized second stage will be added at a later date.

Use Water Power?

The possibility of using the water power available in the Cape mountains in the winter months to generate electricity could be of great significance for the whole Western Cape electricity system, said Prof. A. F. P. J. Heydorn, head of the electrical engineering department of the University of Stellenbosch, last month. Comparing statistics of maximum demand and consumption in 1950 in Paarl, Worcester, Wellington and Stellenbosch with the investigated possibilities of water power, he estimated that Bain's Kloof could, in winter, supply the maximum demand of all those towns together and that the yield was equal to the whole year's consumption of Paarl and Worcester.

Jo'burg Rates Up

An average increase of 10% in electricity tariffs —the first for 16 years—was agreed upon by the Johannesburg city council at a special meeting last month. The increase, to operate from next month, has been necessitated by a rapid rise in costs, and will add £262,000 to the undertaking's income in the next financial year.

Expansion

The city of Lourenco Marques, Mozambique, Portuguese East Africa, is to have a new power station at a cost of Escudos 24,800,000, the contract for which has been awarded to the Belgian firm Sofina. A local firm is also to undertake the underground wiring of the city at a cost of about Escudos 80 million. The present plan is to have both these projects completed within four years.

PERSONALITIES

IN THE INDUSTRY

The Telegraph Construction and Maintenance Co. Ltd., of Greenwich, announce the formation of a Plastics Division to deal with its expanding business in that field, under the managership of **Mr. H. F. Wilson,** B.SC., A.R.I.C., A.I.R.I., formerly technical manager of Telcon, with **Mr. P. W. J. Ayerst** as the divisional sales manager. The new Division will handle the production and marketing of all Telcon's thermoplastic products outside the field of cables. Telcon, of course, pioneered the development of gutta percha, which was the principal moulding material before the discovery of modern thermoplastic. The company has for long supplied gutta percha in a variety of extruded, moulded and fabricated forms, and, following the discovery of polyethylene in 1933, Telcon have commercially exploited that versatile material side by side with its gutta percha products.

Mr. H. F. Wilson

To commemorate his 50 years service with the British Thomson-Houston Co. Ltd., **Mr. P. G. Hibbs,** B.E.M., was presented with a three-piece suite by **Mr. H. L. Satchell,** director and manager, Rugby works, at a ceremony in the Pattern and Carpenters' Department.

Sir Charles Colston, C.B.E., M.C., D.C.M., chairman and managing director of Hoover Ltd., left in the *Queen Elizabeth* last week for his sixty-second visit to the United States. It will be his 122nd Atlantic crossing, including 16 air trips. When, soon after World War I, he first began these Atlantic journeys, they were for consultation with the parent American Company on the necessary steps to build the enterprise in Britain. Now the situation is reversed. The British company has grown to the point where the volume of its operations exceeds that of the American company. Sir Charles was appointed a member of the Board of the American company last year and he goes to the United States this time to lend his knowledge in an advisory capacity to the American enterprise.

Mr. W. E. Scott Lawson has been appointed representative of Berry Wiggins and Co., to cover the counties of Berkshire, Dorset, Hants, Oxford, Somerset and Wiltshire. He will be responsible for the sales of Kingsnorth electrical filling and sealing compounds.

Shortly coming to the United Kingdom on long leave, is **Mr. L. G. Felipes,** A.M.I.E.E., who has recently been appointed consumers' engineer designate to the Trinidad and Tobago Electricity Commission. He was previously electrical superintendent of the Commission's Port-of-Spain power station. Mr. Felipes is taking his long leave in this country and will afterwards spend four months with the Midlands Electricity Board, mostly in the Central Gloucestershire sub-area, to study the commercial aspect of electricity supply.

Mr. L. G. Felipes

At the annual general meeting of the Electric Vehicle Association of Great Britain, held in London last week, **Sir John Kennedy,** O.B.E., M.INST.C.E., M.I.E.E., was re-appointed President of the Association for 1952/53. **Mr. R. Birt,** B.SC., Barrister-at-Law, M.I.E.E., A.M.I.C.E., A.M.I.Mech.E., F.C.I.S. (Sub-Area Liaison Officer, Southern Electricity Board), was elected Chairman, in succession to Mr. Peter Rochs (Austin Crompton Parkinson Electric Vehicles Ltd.). **Mr. H. R. Simpson,** M.I.Mech.E., of T. H. Lewis Ltd., Watford, succeeds Mr. Birt as vice-chairman, and **Mr. J. Wilkie,** of Chloride Batteries Ltd. was re-appointed honorary treasurer.

The end of this month will bring the retirement of another popular stalwart in the electricity supply industry, who has over 50 years' service to his credit, most of them in the Eastern Counties region. We refer to **Mr. P. G. Campling,** M.B.E., M.I.Mech.E. M.I.E.E., manager of the Chilterns sub-area of the Eastern Electricity Board. Born in Norwich, he gained his early technical training in the Corporation's Electricity Department, and then went to Bury St. Edmunds as an assistant engineer. There followed appointments with the Middlesbrough, Weymouth and Bermondsey Councils, and in 1914 he became resident engineer and deputy manager to the Rhondda Electric Supply Co. and Rhondda Tramways Co. But in 1920 he was appointed borough electrical engineer and general transport

Mr. P. G. Campling

manager to Great Yarmouth Corporation, and in his eight years there he was responsible for many developments, including the change over of the system from 83 cycles, and the remodelling of the power station to supply in bulk to Lowestoft and Bungay as well as rural supplies in an area of 200 sq. miles. He was also invited by the municipal engineers in Norfolk and Suffolk to prepare a scheme for the interconnecting of their undertakings. From 1930 to 1938 he was manager of the East England district of the C.E.B., and was afterwards chief engineer and general manager of the Bedford Corporation Electricity Department till nationalisation of the Industry, when he became manager of the Eastern Board's Chiltern sub-area.

Chosen for the post of power station superintendent at Doncaster, Yorkshire Division of the B.E.A. is **Mr. H. F. Clamp,** at present deputy station superintendent at the new Agecroft h.p. generating station. Before going to Agecroft, late in 1950, Mr. Clamp was boiler house superintendent at Kearsley power station. He takes up his new duties at Doncaster on July 1.

Mr. H. F. Clamp

A garden party was held recently at Broome Park, Betchworth, Surrey, the Home for Old People run by the E.I.B.A., when the old people themselves acted as hosts. The guests were shown over the house and after tea enjoyed a delightful ramble through the grounds. The garden party was held in perfect weather and the hosts enjoyed themselves perhaps even more than the guests. Our accompanying illustration, taken on the occasion, shows **Sir John Dalton,** director of C.M.A., **Mr. A. G. Towner** of Venner Ltd., **Mrs. R. E. V. Ely** (wife of Mr. Ely, director of Foster Transformers Ltd.), and **Miss Hoare,** public relations officer of the E.I.B.A.

With the continued expansion of the electrical industry in the export markets, we frequently hear of activities of electrical personalities in connection with the work of the Institute of Export. The latest to hand concerns **Mr. J. W. Midson,** M.I.EX., who is export and advertising manager of Nettle Accessories, Ltd. He has just been elected to serve on the committee of the Manchester branch of the Institute, we understand.

Mr. J. W. Midson

The marriage of **Mr. William B. M. Drake,** elder son of R. H. M. Drake, chairman of Drake and Gorham Ltd., and Elaine Radcliffe, only daughter of Commander and Mrs. Gerald Radcliffe, of Musbury, took place on May 30 at St. Michael's Church, Musbury, Axminster. Mr. William Drake has now joined the staff of Drake and Gorham Ltd. and its subsidiary companies. We offer our congratulations to the happy couple.

At the invitation of the council, **Dr. G. E. Foxwell,** D.SC., F.INST.P., F.INST.GAS E., has consented to continue to serve as President of the Institute of Fuel for a second term.

Bruce Peebles and Co. Ltd., Edinburgh, announce the appointment of **Mr. V. P. Mackay,** of the N.C.B. (Lothians), to the newly created post of chief engineer of the Rotating Plant Department, in which capacity he will be responsible to **Mr. W. B. Laing,** joint general manager, for decisions affecting the company's rotating plant business. Mr. Mackay took up his new duties on June 2.

For reasons of health, **Mr. A. S. Valentine,** M.I.E.E., director and chief electrical engineer of Balfour Beatty and Co. Ltd., is to retire at the end of this month. **Mr. O. M. White,** A.M.INST.C.E., M.I.E.E., who has been with the company for many years, has been appointed to succeed him as chief electrical engineer as from July 1. Mr. Valentine has been associated with the company since its formation in 1909. He was appointed chief electrical engineer in 1925, and has since been responsible for the design and construction of much important electrical engineering work in this country and overseas, of which the Staythorpe and Carmarthen Bay power stations are outstanding examples.

Dr. E. Bradshaw, M.B.E., M.SC.(tech.), PH.D., M.I.E.E., has been appointed to the chair of Electrical Engineering in the Faculty of Technology at the University of Manchester, in succession to

Prof. J. Hollingworth, who is retiring. Dr. Bradshaw, who is now senior lecturer in high-voltage engineering at the College of Technology, Manchester, takes up his new post on September 1.

OBITUARY

Mr. C. J. A. Gill, manager of the Falmouth depot of the Marconi International Marine Intercommunication Co., Ltd., died on Wednesday of last week, aged 62.

We offer our sincere condolences to Sir Montague Hughman, chairman of W. T. Henley's Telegraph Works Co. Ltd., on the death of his wife, **Lady Hughman,** on May 28. Lady Hughman was a frequent guest at many electrical functions, and an active member of the Electrical Association for Women, of whose Croydon branch she was president.

Mr. T. F. Cook, M.P. for Durham East and a member of the Electrical Trades Union, died as the result of a car accident on May 31, aged 43.

Dr. F. W. Carter, M.A., D.SC., F.R.S., M.Inst.C.E., M.I.E.E., who, before his retirement in December 1946, was for many years consulting engineer with the British Thomson-Houston Co., Rugby, died on May 29, aged 81. An author of many technical works, particularly on railway electric traction, he contributed numerous papers to the scientific and engineering world. Prior to joining the Design Engineering Staff of B.T.H. in 1903 he spent three years with the General Electric of America.

NEW LITERATURE

Transients in Power Systems

by H. A. Peterson

MUCH has been written in recent years on the transient aspects of systems and machines, but Professor Peterson seems to have found a new line of approach for this volume in the General Electric monograph series. In general, it is the overvoltages associated with transient conditions that he considers in a treatment that is firmly based on mathematical analysis but is in no way closely confined thereby. The conclusions to which the algebra leads are expanded into lessons for the benefit of the engineer dealing with the design of systems and apparatus. Thus the book admirably fulfils its claim to be both textbook and reference volume.

Overvoltages during power system faults, and the effects of saliency on them are discussed in early chapters, with voltage recovery characteristics following. After the effects of switching surges have been considered, the results of sudden loss of load and of open conductors are dealt with. A remarkably extensive bibliography concludes the book, and adds considerably to its value. Published by Chapman and Hall, 361 pages, 9 in. by 5¾ in. Price 52s.

British Standards Institution Yearbook, 1952

It is a significant indication of the expanding activity and influence of the British Standards Institution that this year's edition of the B.S.I. Yearbook has sixty more pages of information and lists than its predecessor. Most of the features that make this compact reference volume so valuable have been retained, though there has been some slight rearrangement of the matter. This year, however, the auxiliary lists of standards withdrawn and amendment slips issued since the last publication are missing. Against this the yearbook has the great advantage of being well up-to-date. It contains a full list of all standards and codes of practice current at March 31 of this year. Published by The British Standards Institution, 24, Victoria Street, London, S.W.1, 460 pages, 8½ in. by 5½ in. Price 7s. 6d.

Kempe's Engineer's Year Book, 1951

edited by B. W. Pendred, M.I.Mech.E.

MAJOR revision in this year's Kempe's has been concentrated on two sections that are of special interest to the electrical engineer. There are electrical engineering itself, and fuel. The former section now takes account of the 12th edition of the I.E.E. Wiring Regulations, of which an abstract is included, and of some codes of practice for electrical subjects. In the case of the section on fuels, a complete rewrite has been carried out by the staff of the Fuel Research Station. New matter includes notes on the classification of coals, low temperature carbonisation, and oil burners. In addition to these large changes there has been the general revision of contents that keep this valuable publication up to date. Published by Morgan Bros. (Publishers) Ltd., 28 Essex St., London, W.C.2. 2,907 pages. 57th edition. Price 70s.

"Electrical Who's Who, 1952"

THE first edition of this book, published two years ago, found a ready market, and although its limitations were obvious many found it an extremely useful work of reference. This second edition is much more comprehensive, for hundreds more names have been included. This has meant a large increase in the number of pages, but, to keep the biographies of the individuals within a reasonably small space, the type size has also been changed. Thus, with the revision that has been necessary, this new volume should prove a valuable guide to the background of men and women in prominent positions in all sections of the electrical industry. Published by Iliffe & Sons 322 pages, 9 in. by 6 in. Price 12s. 6d.

BOOK RECEIVED

Productivity and Probability, by T. F. O'Connor. A textbook of time and motion study. Published by Emmott and Co. as No. 65 in their series of Mechanical World Monographs, 193 pages, 7 in. by 5 in. Price 5s.

BRITISH STANDARDS

Nickel Silver Strip and Foil for the Telecommunication Industries. *B.S. 1824: 1952. Price 2s.* The standard lays down chemical compositions, temper grades, mechanical properties and tolerances on dimensions and specifies the procedure to be adopted in selecting test pieces and carrying out tests. Details are also given in regard to test certificates and independent tests and an appendix gives a summary of the information to be given by the purchaser in inquiries and/or orders.

General Requirements for Electrical Equipment and Indicating Instruments for Aircraft. *B.S. G100: 1952. Price 6s.* Recently issued by the British Standards Institute, this specification is designed to cover the standards of airworthiness with which all such equipment must comply.

The greater part of the specification sets out general requirements for equipment, operating under certain conditions, information on which is given in various appendices and other data. Attention is paid to acceleration, vibration and other external influences which affect performance. Specified design requirements for particular items are aimed to ensure the safe operation of the equipment and minimise interference with other apparatus in the aircraft. A comprehensive series of tests is incorporated to guarantee that equipment meets the corresponding specification and wherever possible details of apparatus and test procedure are given as a guide to manufacturers and designers.

Stress is placed on the performance of indicating instruments by the inclusion of additional requirements for these components. Discussion of all stages of design from packaging and overall construction to the finer details of instrument movement is developed from the points of view of accuracy, strength and finish.

The standard is to be used in conjunction with the "G" series of British Standards for aircraft materials. In itself it is an attempt to encompass the varied general specifications required and hence to increase efficiency of production of aircraft electrical equipment.

Copies of the standards reviewed above may be obtained from the British Standards Institution, Sales Branch, 24 Victoria Street, London, S.W.1.

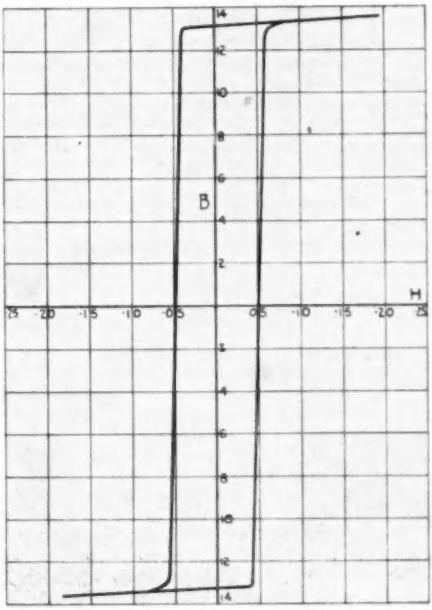
A New High Permeability Alloy

THE increasing use of magnetic recorders and computers and the widening range of application of saturable reactors as a convenient method of voltage control have necessitated the development of high permeability magnetic alloys as suitable core material.

Permalloy F, a new magnetic alloy of nickel-iron developed by Standard Telephones and Cables Ltd., is designed primarily to meet this need. This alloy has been produced by the domain orientation method, resulting in its having a nearly rectangular hysteresis curve and a low value of coercive force. The curve of the magnetisation characteristics indicates its high permeability.

Supplied as a toroidal core wound from tape, and heat-treated by the manufacturers, it is ready for immediate use. It should be noted that its sensitivity to strain is high, which is a common feature of all such materials, and consequently mishandling or damage during its use will injure its magnetic properties.

When used as core material for saturable reactors, it is proposed to market the alloy in a small range of core sizes from $\frac{3}{4}$ in. to $1\frac{3}{4}$ in. mean toroidal diameter. Smaller core sizes, for other uses, will be standardised as the need directs.

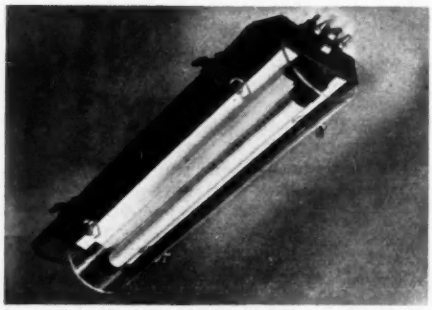


Hysteresis curve—flux density in kilogauss to a base of field strength in oersteds

The BUYER'S *Column*

Non-flameproof-mine Lighting

DESIGNED for use in non-flameproof areas in mines in colliery main roads, etc., is a two-foot fluorescent fitting added to the range of



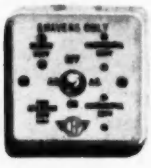
The new Simplex fitting suitable for colliery main roadways

equipment supplied by SIMPLEX ELECTRIC CO., LTD., Broadwell, Oldbury, Birmingham.

Constructed of sheet steel, the fitting accommodates 2 ft 20 W or 40 W fluorescent lamps. The cover, which is "Perspex," rests on a rubber bed, an arrangement which excludes dust and moisture. The reflector is white stoved enamel, whilst the standard exterior finish is black crackle enamel. Instant start control gear is fitted. Lampholders are made of moulded rubber, whilst moulded connectors have 15 amp. through cable connections. Four $\frac{3}{4}$ in. knockouts are provided which will take Z.020 armoured cable glands when fitted with locknuts. Two holes tapped $\frac{3}{8}$ in. Whitworth are provided for suspension.

Shaver Service for Visitors

OVERSEAS visitors visiting Britain's hotels are usually dismayed to find the lack of suitable power points for personal radio, travelling irons and, most important for our male visitors, provision for operating their electric razors.



Wise hoteliers will ensure such provision by the installation of the Chilton universal electric shaver socket, made by Chilton Electric Products, Ltd., Hungerford, Berkshire.

Made in surface and flush patterns the socket, at the reasonable price of 35s., affords provision for British 230 V standard two-pin plugs, continental 220 V and 120 V plugs, and American 110 V flat-pin plugs. It is for 230 V a.c. supply, and is provided with on-off switch. The face plate is supplied in an attractive cream finish.

Bylock's "Regency" Cleaner

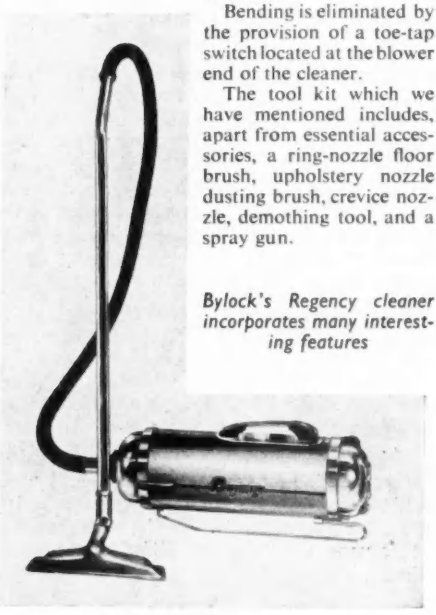
THE "Regency" suction cleaner which was recently marketed by BYLOCK ELECTRIC LTD., South Street, Enfield, Middlesex, combines elegance with high power efficiency.

It has been designed from the outset to give years of efficient effortless cleaning. Of all-metal construction with full-length chromium-plated runners for easy movement, the cleaner has an attractive modern design. It incorporates a number of interesting features besides being equipped with a comprehensive tool set.

The power unit for a.c./d.c. mains operates at 13/14,000 r.p.m. and is mounted on rubber for quiet operation. Coupled to this is an aluminium two-stage six-blade fan to ensure high suction. Between the fan and the dust-bag is a replaceable filter fastened in protective screening. Hose connections are specially designed that there are no pins or lugs to line up. A spring lock ensures secure connection, whilst a rubber seal ring makes the joint airtight. Swivel joints are fitted at each end of the hose. A swivel adaptor is included in the kit to permit every cleaning tool to swivel or turn in any direction, assuring a perfect suction seal.

Bending is eliminated by the provision of a toe-tap switch located at the blower end of the cleaner.

The tool kit which we have mentioned includes, apart from essential accessories, a ring-nozzle floor brush, upholstery nozzle dusting brush, crevice nozzle, demothing tool, and a spray gun.



Bylock's Regency cleaner incorporates many interesting features

The "Micro-Motor"

AN electric motor which is 1⅝ in. long x 1 in. max. diameter and weighing 1·3 oz. is the latest product of VICTORY INDUSTRIES, LTD., Barfax Works, Worplesdon Road, Guildford.

The Micro motor is smaller than a matchbox

These motors are produced in two standard voltages, 6 V and 12 V. Test results are said to have indicated that the 6 V motor has a torque of 11 gm. cm. at 5,700 r.p.m. with a rating of 3·2 W whilst the 12V motor has a torque of 13½ gm. cm. at 6,200 r.p.m. at 4·1 W.

The field of the motor is a ring permanent magnet and the armature carries a standard type of three-pole copper commutator. Motor shaft is $\frac{1}{16}$ in. diam. and runs in oil-impregnated bearings.

A "Swan Brand" Washboiler

PUBLICATION of a leaflet, No. 145, by BULPITT AND SONS, LTD., Swansea Works, Birmingham 1, draws attention to the introduction of a new addition to the range of "Swan Brand" products.

Catalogue No. 600 washboiler has a body of heavy gauge steel, hot galvanised after manufacture. Capacity of the appliance is 4 gallons.

When used as a washboiler an automatic percolating device turbulates the water, which is heated by a 1,800 W immersion heater fitted with an automatic cutout and provided with earthed connector plug and nine feet of heavy three-core cable.

No doubt readers will realise that this unit has many other uses in canteens and on farms, etc. £6 10s. list price.

Plessey Pillar type Press Tool Set

THE pillar-type interchangeable press tool set introduced by the PLESSEY CO., LTD., Vicarage Lane, Ilford, Essex, combines the advantages of pillar-type press tools with the economy of the interchangeable standard die set.

As the top and bottom bolsters can be used indefinitely, tool expenditure is greatly reduced, and tools can be stored and handled more conveniently. The bolsters are manufactured from cast iron, and chequering on the clamping faces overcomes creep. Disposed at the rear of the sets to provide maximum working clearance and visibility, the pillars and bushes are of hardened and ground cast steel. Wick feed oil reservoirs are fitted on each bush.

The die set is clamped to the top bolster by forged high tensile steel dogs, and to the bottom bolster by a hardened and ground cast steel strip.

The filler plate supports the die, and a range of plates is provided for use with each bolster size in which the die maker can cut his own clearance opening to suit the appropriate die.

In the case of blanks having thin forms, or where it is necessary to build up the shape with die inserts, the special filler plate is attached to the die by replacing two of the standard dowels with longer versions and continuing these through the filler plate to obtain permanent assembly.

Bavarian Type Brilliance

NOW in production by the HOUSE OF PETER MARSH LTD, Alcester Street, Birmingham 12, for overseas markets as well as this country, is a range of wrought iron lighting fittings based on centuries old Bavarian designs.

These fittings which are hand made, comprise designs for table lamps, hall and porch lights, chandeliers and candelabra wall fittings.

The most intriguing part of the design is the incorporation of odd sized pieces of lump glass of different colours in the shades. The fitting forms a most fascinating and cheerful addition to any household, hotel or restaurant.

Our illustration of the "Capri" lantern gives a good idea of the general style of these attractive fittings.

TRADE PUBLICATIONS

PLASTICS.—Entitled "Essential Materials for Essential Work," a new booklet detailing the advantages of Bakelite, Warerite and Vybak Plastics has been issued by Bakelite Ltd., 12-18 Grosvenor Gardens, London W.1.

IMMERSION HEATERS.—The specification folder issued by Simplex Electric Co. Ltd., Broadwell, Oldbury, Birmingham, covering Creda immersion heaters and circulators (Serial No. WH. 1882A) has recently been revised.

AIRDUCT HEATING.—New leaflet giving particulars of the standard size airduct heating units, incorporating black-heat safety sheathed rod type elements, has now been published by Eltron (London) Ltd., Strathmore Road, Croydon.

SWITCHGEAR.—Type OB200 hand-operated air break circuit-breakers, and type DO75 and 150 automatic direct-on contactor starters are described fully and illustrated in new leaflets K.110 and K.120 recently published by the Belmos Co. Ltd., Bellshill, Lanarkshire.

SWITCHGEAR.—Lancashire Dynamo Switchgear Ltd., the newly formed company in the Lancashire Dynamo Group have issued an illustrated leaflet describing the range of heavy industrial switchgear which they are manufacturing. The address of the company is Bristol Road, Bridgwater, Somerset.

TELECOMMUNICATION EQUIPMENT. — The type 32A Mark II selector unit forms the subject of Engineering Bulletin 400 issue 3, one of a series of detailed publications describing Strowger telecommunications equipment and engineering practices issued by Automatic Telephone and Electric Co., Strowger House, Arundel Street, Strand, W.C.2.

FANS.—Full details of the manufacture installation and prices of "Tornado" aerial (ring mounted) fans are given in the latest catalogue published by Keith Blachman Ltd., Hall Mead Road, Tottenham, N.17.

PLUGS AND SOCKETS.—A new and comprehensive catalogue of all their products has just been issued by Geo. H. Scholes and Co. Ltd., Wylex Works, Wythenshawe, Manchester. Among its pages are particular references to the 20 amp Wylex switch and the Wylex 20 amp isolator.

"Talurit" clamping supersedes splicing

New methods of wire rope jointing save over 80% time and materials

THOSE of us who have had to undertake the splicing of wire ropes will have painful memories of what even to the most experienced engineer wire worker or mariner is or was a long, tedious and quite difficult task. Indeed on the larger ropes used for berthing ropes, lift cables, tower stays, the time needed was usually some four or five hours.

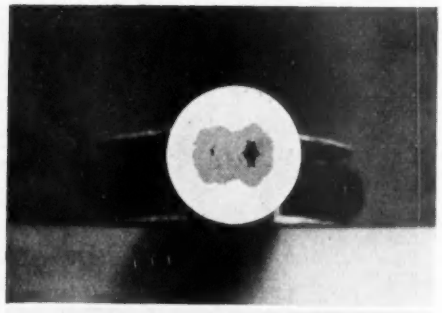
The invention and consequent introduction to this country from Scandinavia of the "Talurit" system of wire rope clamping, eliminates this tedious handwork and provides in five minutes on the largest diameter rope a join which is stronger than a splice.

At present the method can be used for wire ropes up to 60 mm. Two thicknesses of the rope are placed in the "Talurit" ferrule, of aluminium alloy containing silicon, manganese and magnesium. The ferrule and ropes are placed in to a "Talurit" press. The appropriate weight/pressure is exerted to mould the ferrule and ropes into one mass. By compressing the ferrule its shape is so altered that the two thicknesses of rope are confined into the same space as normally occupied by one.

The method has been approved by Lloyd's Register of Shipping and others and is at present under test by other notable bodies in this country.

There is no fear of chemical action between the metals due to the careful composition of the alloy but a special type ferrule should be used with chrome and stainless steel ropes.

No restrictions will be placed on the use of the "Talurit" system made and distributed in this country by Cable Covers Ltd., St Stephens House, Westminster, S.W.1, because a continuous supply of ferrules is assured. The system will be available under licence to makers and users of wire ropes.



The compression jointing can be seen clearly in the upper photo. The picture underneath shows a variety of joints possible with "Talurit"

The WEEK in NEWS

Prices of E.L.M.A. Lamps Changed

FLUORESCENT TUBES DOWN—FILAMENT LAMPS UP

THE prices of fluorescent lamps have been reduced and those of filament lamps increased, it was announced by the Electric Lamp Manufacturers' Association last Thursday. The alterations became effective on Sunday (June 1). Mr. C. Hughes, making the announcement, said that the two main causes of the rise in price of filament lamps were the heavy increases in cost of production, and the all-important need to have sufficient money to extend and continue research work. The ordinary domestic lamp (60 W single-coil) has gone up from 1s. 1d. to 1s. 3d. (P.T. 4d.); and the 100 W single-coil lamp has gone up to 1s. 9d. (P.T. 5d.). With few exceptions the increases are of 1d., 2d. or 3d. (excluding the tax). The exceptions are the large types of lamps. Referring to rises in production costs it was stated that tungsten ore had risen by some 400%, lead-in wire by 50%, glass and packaging by about 40% and brass caps by 36%. In addition wages, transport and the cost of factory overheads had gone up by considerable mounts. These are incidentally the first increases in price since the war, and were recognised as almost inevitable by the Monopolies Commission during their recent inquiry. Prices were reduced in both 1945 and 1949.

As regards fluorescent lamps that industry was comparatively new and increased demand coupled with more efficient methods of production have enabled reductions. Decreases amount to 2s. 6d. in some cases (the 5 ft. 80 W tube), but the average reduction is 2s. 3d. (excluding tax adjustments).

FIRMS ANGRY OVER NEW TARIFFS

SEVERAL Midland Chambers of Commerce are considering taking joint action following bitter feelings expressed by many industrialists at the great increase in the size of their electricity accounts under the new industrial tariff. This was stated at last week's meeting of the Walsall Chamber, when the secretary declared that she was advising complainants to pay under protest for the time being.

The present policy is that firms should first complain to the Midland Electricity Board on their own account, and if no concessions were forthcoming, then the Chamber could act. It had been suggested that all objections received by the Chamber be forwarded to the Board. Present at the meeting was Mr. J. H. Greenwood, Walsall district manager, who said he had also received numerous complaints and generally speaking each was being dealt with on its merits. Chief objection of one manufacturer was that charges based on floor space had no relationship at all to consumption of electricity.

GOVT. LOANS FOR INDUSTRIAL FUEL SAVING APPLIANCES

THE Minister of Fuel and Power has given details of the Government's experimental loan scheme to encourage the installation of industrial fuel-saving equipment. The total sum involved will not exceed £1 million, and loans to individual firms will not be above £25,000. Applications are to be dealt with in order of receipt and commercial rates of interest will be charged. The scheme is open to industrial concerns wishing to install approved fuel-saving equipment or to insulate their factories, but who have insufficient capital to do so.

The scheme is to operate for one year only, and work must be completed within a reasonable time (5 years at the most). The specified fuel-saving devices involved are back-pressure engines and turbines, waste-heat boilers, feed-water economisers, air preheaters, heat exchangers and structural insulation of single-sheeted roofs and walls.

An explanatory leaflet giving full details and an application form may be obtained from the Ministry's Fuel Efficiency Branch, Queen Anne's Chambers, Dean Farrar Street, S.W.1.

The First Half-Century

An occasional contributor to these pages, Mr. J. B. C. Kershaw, F.I.C., informs me that he has opened a laboratory at Waterloo, Liverpool, for the analysis of fuel, water, flue gases, etc. No one will dispute the value of careful analysis of coal and flue gases with a view to the most economic working of our boilers, whether or no one believes in the ultimate solution of the fuel problem by means of the carbon battery. Mr. Kershaw, with a touch of irony, points out to engineers who increase the air draught to avoid being fined for smoky chimneys, that they pay much more for extra fuel than they would be likely to pay in fines; indeed, he estimates the extra fuel consumption due to an 8% of CO_2 in place of a 14% at no less than 10%.—*From our issue of June* 5, 1902.

E. MIDLAND BOARD WINS £17,139 CLAIM ON RATES

IN the Queen's Bench Divisional Court recently, the East Midlands Electricity Board won a claim for the repayment of £17,139 rates overpaid between October 1945 and March 1948 on the premises in Northampton. The local valuation officer was ordered to amend the valuation lists to show a lower assessment, retrospective to 1945. The court was told that the property was occupied by Northampton Electric Light Co. Ltd., until 1948, and that in 1945 the company appealed against the assessment as excessive. A reduction was agreed upon in 1950 but the valuation officer refused to amend the lists retrospectively. The Attorney-General for the valuation officer explained that the Town Council would be reponsible for the repayment but felt it dangerous to proceed without a decision by the court.

The Lord Chief Justice said he thought it would be startling if no provision had been made for rights which had accrued before the Act came into force. Granting an order of mandamus, the Court allowed the Board their costs.

Quotas for 1952 Imports Fixed

Electrical Goods to Value of £195,000 will be allowed

WITH regard to the allocation of licences following the restrictions on imports imposed by the Chancellor of the Exchequer last March, the Board of Trade has announced that quotas have been established for the affected commodities and licences will in future be issued to the value indicated. In allocating individual licences account will be taken of the value of applicants' imports during 1951. Licences will be valid until the end of this year.

The electrical goods affected fall under three headings. Under general appliances are bells and buzzers, blankets and pads, cooking apparatus, coffee percolators, fans, floor polishers, gas lighters and lighter elements, drink mixers, hairdressing appliances, irons, kettles, shavers, toasters and vacuum cleaners, which have been given a quota to the value of £70,000. Then there are filament and discharge lamps (including fluorescent), lighting appliances not containing pottery or glassware except for insulating purposes, hand lamps, pocket lamps, torches and inspection lamps, which have a quota of £100,000. Finally, there are miscellaneous appliances, such as domestic dishwashing machines, refrigerators of a capacity not exceeding 12 cu. ft., lawn mowers, carpet sweepers, and laundering and dry cleaning machines (being washers and driers of capacity not exceeding 3·5 cu. ft. and wringers and ironers with rollers not over 18 in. long), which may be imported to a total value of £25,000.

The total value of licences available for imports during the remainder of 1952 is expected to be substantially greater than the values given above. This is because many firms have entered into contracts larger than their share of the quota. The value of licences already issued will be deducted from the value of those to which firms will be entitled under the quotas.

OFFICIAL PUBLICATIONS

INDUSTRIAL FUEL SAVING.
Explanatory Leaflet from M. of F. and P. (*see page* 1041).

FENCING OF HYDRAULIC PRESSES.
Report of Committee on Safety of Power Presses, H.M.S.O., 1s.

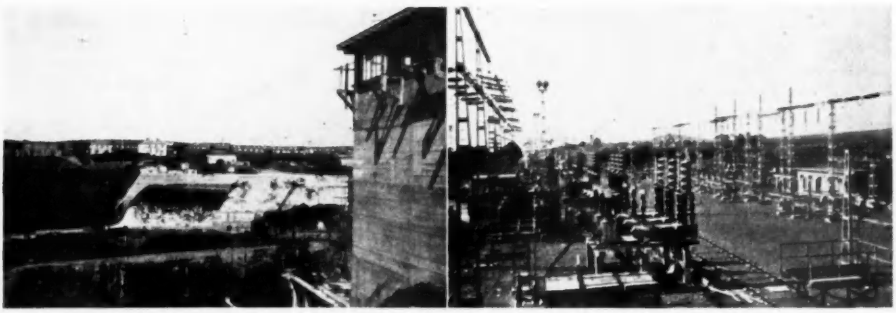
BRITISH STANDARDS.
B.S. 1862. *Cables for Vehicles. Price* 2s. 6d.

SCIENTIFIC POLICY.
Fifth annual report of Advisory Council, H.M.S.O., 6d. (*see page* 1014).

HARWELL.
Report covering years 1946-1951. H.M.S.O., 6s. (*see page* 1030).

NATIONAL COAL BOARD.
Report and Accounts 1951, H.M.S.O., 8s. 6d. (*see page* 1020).

Below are two recent photographs of the Cathleen Falls hydro-electric scheme of the Eire Electricity Supply Board on the river Erne, Ballyshannon. On the left can be seen the dam and a corner of the new power station which is to house two 22,500 kW generating sets. The first set was commissioned last November and the second is expected to go into service this month. On the right is part of the outdoor 110 kV switchgear station. This scheme is now nearing completion



A view of the modern interior of Leith's new lighthouse

SOLUTION FOUND ON WIRING RENTALS

A MEETING of the Norfolk Local Committee of the Eastern Electricity Consultative Council took place last week and detailed consideration was given to the position of consumers whose combined agreements for hire of wiring installations with charges for consumption had been terminated by the Board recently. The Board's decision to end wiring rentals effects Norwich particularly. Reference to the situation was made in our May 22 issue.

Ald. W. J. Bennett, chairman of the Consultative Council, said he had received a statement from the Board to the effect that in cases where the ownership of the wiring installation was being transferred free of charge, the Board would enter into a repair contract on the basis of the existing rates of charge. Where the installations were not being transferred free, the price of the installation could be paid by instalments of the same amount as the rental charges. During the time taken to pay those instalments, maintenance would be carried out without additional charge. After that period the Board would enter into a new repair contract.

The Committee agreed that the statement provided a satisfactory solution to the difficulties involved in the previous proposals.

Institute of Fuel has Busy Year

THE session just completed has been a busy one for the Institute of Fuel. This body organised to further the advancement of knowledge and practice in fuel technology has been particularly involved in the fuel problems which have been the concern of everyone from Parliament to the man in the street. Dr. G. E. Foxwell, who continues as President, has travelled the country addressing meetings in all the principle towns and cities.

The Institute is now 4,000 strong and full programmes of meetings have been conducted. One of the year's major tasks has been the revision of the Institute's Education scheme.

A.E.I. Review of 1951

THE practice of publishing the chairman's statement and financial details in book form for distribution among shareholders is becoming increasingly popular among electrical firms. The latest to reach us came from Associated Electrical Industries Ltd. Current business having been dealt with, the remainder of the brochure goes on to depict the recent achievements of each member of the Group. It is produced in pleasing style, and most of the story in picture and caption form.

New Installation at Leith Lighthouse

LIGHTING engineers of the British Thomson-Houston Co. Ltd. have been busy in recent months on a number of installations in and around Newhaven. Their main task for the Leith Harbour and Docks Electricity Dept. was the installation in the new lighthouse which is claimed to be one of the most modern in the world. The lighthouse was designed to serve as the control centre for the whole of the Leith Dock navigation light system. It has been illuminated by 21 single-lamp industrial fluorescent fittings in the control, power and keepers' rooms, as well as in the sundry passages.

Along the top of the breakwater extending from the lighthouse to Newhaven, a total of 13 rural enclosed type lanterns with tungsten lamps, have been mounted on concrete columns. They serve as guiding lights for the keepers. Finally, the same company's equipment, consisting of elliptical angle and dispersive reflectors, has also been used by the Leith Dock Commission for relighting sheds, warehouses and quaysides.

Batti-Wallahs' Hear Fourth Sea Lord

SUBMARINES provided the subject for the talk following last month's Batti-Wallahs' luncheon, held at the Connaught Rooms, London. The speaker on this occasion was Rear-Admiral S. M. Raw, C.B., C.B.E., the Fourth Sea Lord, who reviewed the history of the submarine service in the Royal Navy. This began with the 160 h.p. Otto-engined vessels of 1901, and the "A" class craft of a year later, and proceeded through the alphabet until today a powerful 1,700 ton class again bore the distinguishing letter A.

In the last war, said the admiral, the service reached at its peak 13,250 men, including those serving in depot ships, only 1% of the total strength of the Royal Navy.

Scots Inquire into Power Supplies for Industry

A SPECIAL committee has been appointed by the Scottish Council (Development and Industry) to examine the question of location of industry in relation to power supplies. Their terms of reference are to prepare a survey of the estimated long-term availability and location of industrially important sources of power in Scotland; to prepare a survey on the foreseeable pattern of industrial development; and, bearing the two in mind, submit a report with recommendations upon factors influencing industrial development which are related to power supplies.

After the Council's meeting, which took place last week, the secretary, Dr. C. Macrae, said the investigation would cover all potential sources of power, not only coal and electricity, including the new H.-E. schemes, but also such prospective developments as the use of peat as fuel for gas turbines. It was felt that it was most important to get a good picture of the future pattern of power supplies in Scotland.

Members of this special committee are Prof. A. S. T. Thomson (chairman), the Earl of Balfour, Prof. A. K. Cairncross, Dr. W. J. Jenkins, and Mr. J. Lang.

At the same meeting the Caincross Committee's report on local development in Scotland was received and it was decided to submit it to the Government.

Awards for Radio Articles to be made at Radio Show

AWARDS to be given by the Radio Industry Council for published articles deserving commendation by the industry, are expected to be made at the National Radio Show, scheduled to take place at Earls Court between August 26 and September 6. The panel of judges appointed, hopes to make its first awards in respect of articles published between January 1 and June 30 this year. Details of the competition were given in our November 15 issue last year. Entries for the first half of this year must be submitted (by authors or editors) up to July 7.

"House-Warmer" at E.C.A.'s New Premises

A LARGE and formidable number of guests, headed by Lord Citrine, chairman, and Mr. E. R. Wilkinson, commercial manager, B.E.A., and Mr. F. J. Erroll, M.P. for Altrincham, gathered at the new premises of the E.C.A. for a house-warming party last week. The move has now been completed, and no doubt the staff will soon have settled down in their new surroundings.

Although the offices in Kingsway were entirely adequate at the time the E.C.A. took over in 1937, they have since become somewhat cramped, and more spacious accommodation became necessary. Also the lease of the old offices was nearing its end. The four floors at No. 14 Bedford Row should suit Head Office admirably, with ample room on the ground floor for meetings and sufficient elsewhere to do the ever-increasing amount of work.

Fall in Midlands' Demand for Electricity

MENTION has been made in these columns previously to the decline in electricity consumption in the Midlands. Disclosing that there had been a considerable reduction this year, Mr. C. R. King, chairman of the East Midlands Electricity Board, warned that if the situation continued it could have a marked effect on the economics of electricity supply.

This was hardly the time, he said, to put into operation some economists' suggestions that electricity charges should be made so high as to force consumers to use gas for heating and cooking. Large sums were being invested in new power stations, said Mr. King, to meet a demand which might not exist when they were ready.

He said that in March consumption was 50 million units less than in the corresponding month last year. He instanced a week last month when generating plant available to meet the load exceeded by one million kilowatts the actual requirements of consumers.

Mr. King was speaking at a luncheon given by Coventry's new Mayor, Ald. B. H. Gardner, a member of the Area's Consultative Council.

Our illustration shows another mobile service centre being opened. It is one of two new centres just commissioned by the S. Western Electricity Board to tour villages in the Taunton sub-area which have been connected recently. The canvas at the side is used for individual demonstrations and discussion with consumers

One of the Eastern Board's new electric vans, showing the useful tailboard

NEWS IN BRIEF

French National Assembly has decided to introduce a system of electric voting to save time.

Barrow town council's street lighting section has been expanded recently so that in addition to providing street lighting it will also carry out all electrical maintenance work.

It is understood that the Electrical Trades Union is to have a stand at the National Radio Show in August.

Colour will be a dominant feature of the wide range of lamps which the B.T-H. are showing on their stand at this year's Royal Tournament.

The B.B.C. has ordered two 5 kW vision transmitters and two 2 kW sound transmitters with associated equipment, from Marconi's Wireless Telegraph Co., Ltd. One installation is to be used as a standby at Sutton Coldfield.

Because they consider the estimated cost of between £800 and £900 to be unjustified the Eastern Electricity Board refused to lay on an electricity supply to the showground at Needham for the County Show.

Number of visitors who passed through turnstiles at Fourth Liege International Fair was 181,640. The 9,642 visitors from abroad came from 41 countries.

London Electricians Out on Strike

ABOUT 3,000 electricians employed by contracting firms in London, came out on strike last week because of a dispute between the National Federated Electrical Association and the Electrical Trade Union. The dispute arose from the recent action of Battersea Festival Gardens, where some E.T.U. members engaged on direct labour were told they were redundant, following which there was a strike of other E.T.U. members there. Festival Gardens decided to end the system of direct labour on electrical work and a contract was given to an N.F.E.A. firm. But the union members of this firm declined to work and Mr. Penwill, director of the N.F.E.A. cancelled a J.I.C. meeting on wages and holidays intimating that there would be no resumption of normal negotiating machinery until an undertaking was given that there would be no recurrence of the incident at the Festival Gardens. That action led to provincial electricians threatening to join the strike. But that possibility may be avoided, for officials of the N.F.E.A. and E.T.U. agreed to attend a joint meeting at the Ministry of Labour yesterday (June 4) to discuss the dispute.

Delivering Heavy Electrical Goods

A FLEET of Morrison-Electricar 20 cwt vans has recently been put into service by the Eastern Electricity Board. They are to be used for the delivery of heavy electrical appliances which often cause considerable difficulty. In future the transport of such items as cookers, refrigerators and washing machines from showrooms to customers will present little trouble, and as a further aid to handling these bulky items a Burtonwood tailboard lifter has also been fitted.

This tailboard is manually operated and can be raised from the ground to a height of 3 ft above the van floor. It can also be fitted with castors and used as a trolley. When the tailboard is closed, a roller shutter completely encloses the rear of the van.

FIRST WINTER COMPLETED

THE first annual meeting of the Newport Electric Club, formed last autumn, took place recently, and elections to officers and committee held. Various visits to works are being arranged for the summer months and the monthly meetings will recommence on October 14. Arrangements are also being made for a dance to be held in November.

Plant Engineers to Prepare Fuel Policy

A proposal that the Institution of Incorporated Plant Engineers should set up a national fuel policy committee received unanimous support at the Institution's recent national conference. Mr. L. G. Northcroft, O.B.E., who proposed the setting-up of the committee, suggested that the views of the users of fuel and power were heard far less than those of the suppliers. The Institution, which represented the technical users of fuel and power in industrial production and services had the competence to offer views and recommendations on fuel policy to the Government and to any advisory body it might set up.

Questions in Parliament . . .

Meters Bill

An amendment to reduce the period of extension for certification of electricity meters from five to three years was moved in the House last Thursday. The total time which would have been taken under the Bill as it stood to check all meters would be 20 years, which Sir Herbert Williams thought to be too long. He sought an assurance that the matter was receiving urgent attention so as to ensure that consumers were not cheated by the use of inaccurate meters.

Replying, Mr. L. W. Joynson-Hicks pointed out that work did not start until mid-1938 and was interrupted first by the war, and then by nationalisation. In 1936, there were 9 million untested meters, but since then all meters installed had been certified. Some 5½ million new certified meters have been installed and some 6½ million old ones certified. At present there were about 15½ million meters in the country. It was reckoned that there were some 4 million uncertified meters and that about one million were attended to each year. Remarking that a greater speed seemed hardly possible, Mr. Joynson-Hicks reminded the House that those meters were not evenly distributed throughout the country. The amendment was withdrawn.

The Electricity Supply (Meters) Bill was read a third time and passed.

Hire Purchase of TV and Radio Sets

The President of the Board of Trade replied last week to questions concerning the apparent breach of hire-purchase regulations in respect of radio and TV sets. He said he believed existing regulations were adequate and that he was aware of the increase in the number of rental agreements. If any cases brought to notice proved on investigation to involve a breach of the relevant Order, action would be taken, he said.

Action by E.L.M.A.

In a written answer last week the Minister of Supply stated that he was satisfied with the assurances given by E.L.M.A. with regard to the Monopolies Commission's recommendations. The Association had taken specific action on those recommendations which required it, and the implementation of those of a continuing nature would, he said, be closely watched.

H.-E. Schemes in N. Wales

Replying to questions on hydro-electric schemes in N. Wales, Mr. G. Lloyd stated he had been informed by the B.E.A. that some doubt had arisen concerning the suitability of a site proposed for a reservoir in the Ffestiniog scheme. Consequently further action had been stopped until they were satisfied on the point. Mr. Lloyd added that no plans or application for sanction of capital investment had yet been submitted to him in respect of schemes at Rheodol, Mawddach, Conway, Snowdon and Nant Ffancon.

Denationalisation of Electricity?

Mr. H. Hynd asked the Minister of Fuel and Power last week what progress had been made in returning the gas and electricity industries to municipal and private ownership. Mr. Lloyd stated that that matter would fall to be considered when a review of the existing organisation of those industries was undertaken.

Interest Charges

The rate of interest on the N. of Scotland H.-E. Board's last stock issue on May 8 last of £20 million was 4½%, the Secretary of State for Scotland told the House last week. Had the issue been made, like the previous one, at 3½%, the annual interest charge would have been £150,000 less, he said. He had been asked what additional financial burden the Board would incur as a result of the increase in the rate of interest charges.

Standard Tariffs

Details of the general principles of the proposals with regard to the standardisation of electricity tariffs approved last year, were published in Hansard last week. Firstly, the number of domestic tariffs should be reduced to not more than two, consisting of a two-part tariff with an alternative flat rate, or a block tariff, or both. It was recommended that the assessment of the fixed charge of the two-part tariff or the size of the initial block in the block tariff should be determined on the basis of either the number of rooms or floor area.

As regards commercial tariffs, again two should be available—namely, a block tariff for smaller concerns (the size of the initial block being based either on assessed demand or floor area), and a two-part tariff for larger consumers comprising a maximum demand charge and a unit charge subject to adjustment with fuel costs. Thirdly, there should be two main industrial tariffs similar to those for the commercial consumer. It was, however, recognised that a number of special agreements would be necessary.

Farm tariffs should be the same as that adopted for domestic consumers, either two-part or block. For farmhouses, the basis of assessment should again be on the number of rooms or floor space. For other buildings and purposes the basis of assessment should be either assessed demand or floor area.

Finally, provision was made for off-peak supplies. Commercial and industrial consumers supplied on terms incorporating a maximum demand charge should be given a concession in respect of excess demands taken at night over and above daytime requirements. Also, special terms should be offered to those industrial and commercial consumers for supplies taken wholly during off-peak periods.

Electric Supply News . . .

Hams Hall

Although the B.E.A. has received the consent of the Minister of Fuel and Power to the erection of the "C" section of Hams Hall power station, of 360 MW capacity, Meriden rural district council has registered its disagreement with the Ministry's view that the proposal could not be questioned on civil defence and public-health grounds.

Monmouth

News of proposed electricity development in the area was given to the Rural District Council recently by Mr. A. J. Roberts, who had attended a meeting of the Consultative Council. The South Wales Electricity Board had agreed to provide a supply for the housing site at Dingestow, he said. The high voltage line between Llanvair Discoed and Monmouth, which was included in the two-year plan submitted to the Council, would be completed by the end of this year or in the early months of 1953. Electricity should then be available for a wide area. When the plan for the next two or three years was submitted next autumn, he believed that their area would receive favourable consideration.

North of Scotland

At the official opening of the Kerry Falls water power scheme last Thursday, Mr. T. Johnston, chairman of the North of Scotland Hydro-Electric Board, said that the station's present capacity was 750 kW, and a further 500 kW set was being installed. The distribution scheme already extends over 55 miles of h.t. and 38 miles of l.t. lines, now serving 560 consumers in 35 crofting townships. When the Storrs Loch (Skye) power station (with two 800 kW sets) was inaugurated last Saturday, Sir Hugh Mackenzie, deputy chairman of the Board, said there were now 850 consumers on the island, but by 1953 the number should be 2,500.

Oxford

A proposal by the B.E.A. to erect a new transmission line between Cowley and Yarnton substations, to meet the increasing demands in the first-named area, is referred to in the annual report of the Oxford Preservation Trust. This latter body hope that pylons which may be erected on Shotover Ridge will not spoil the appearance of Oxford's most popular beauty spot. They are also anxious that if a new generating station is eventually built in the area, as is envisaged, it shall be sited so as not to mar the landscape. To this end discussions have been entered into between the parties concerned.

LIGHTING SCHEMES

Colne Valley.—The U.D.C. is applying to M.o.T. for permission to electrify lighting on the main road between West Slaithwaite and Marsden.

Halifax.—T.C. recommended to approve the installation of electric street lighting from North Bridge to the borough boundary at Northowram, at a cost of £6,942.

Company Activities . . .

Allen West and Co.

It is proposed to issue 780,000 5s. shares at a price of 8s. each by way of rights in the proportion of one for every five held.

Associated British Engineering

The net profit, after all charges, including taxation, is £72,157 (*£54,236*). The final Ordinary dividend is 7%, making 10% on capital increased from £250,000 to £1,000,000 by free capital bonuses.

Calcutta Electric Supply Corpn. Ltd.

Units sold in 1951 amounted to nearly 882 million compared with some 763 million in the previous year, the annual report shows. Gross revenue at £4,350,517 was £528,101 more than for 1950. The year also saw the connection by the company of a further 47,032 houses. The net revenue for the year, plus the balance brought in, amounts to £1,518,443. The sum of £297,111 has been provided to finance extension of generating machinery; £35,000 is transferred to the retiring gratuity fund, and after dividends there is £170,268 carried forward. Sir James Donald, chairman, says the increase in sales was shared by all classes of consumer. The jute mills recovered from difficulties in 1950 and account for 34 millions of the increased sales. In regard to expansion of the company's generating plant, he states that the chief problem at the moment is finance—a consideration which gives much concern to all supply undertakings in India.

Crompton Parkinson

A scheme to relinquish to "A" Ordinary stockholders most of the voting power at present held by Ordinary stockholders is proposed. At present the "A" stockholders have no voting rights, though they hold 95% of the issued equity. The holders of the £150,000 of Ordinary stock have 400,000 votes and the Preference stockholders 670,725 votes between them, though the Preference votes can only be exercised in special circumstances. Under the new scheme the Preference stockholders will retain their 670,725 votes

but the 400,000 other votes will be shared by all equity holders. This will be done by merging both classes of Ordinary capital into one class. The main Ordinary stockholders are the directors who hold beneficially £98,912 of the £150,000 Ordinary stock in issue. In return for losing voting control, the Ordinary stockholders will get a free bonus issue of one new unit for every eight held. Mr. Albert Parkinson, chairman, also states that the current economic conditions have led the directors to the view that it is undesirable to raise additional permanent capital at present.

East African Power & Lighting Corp. Ltd.

At the meeting in Nairobi on June 18 a resolution will be submitted to raise the authorised capital to £7,500,000 by the creation of 1,000,000 shares of £1 each.

Enfield Cables Ltd.

The directors announce that after consultation with certain major shareholders, including institutional investors, Peat Marwick Mitchell and Co., chartered accountants, have been appointed by the board to investigate the affairs and business of the group and to make recommendations. Peat Marwick Mitchell and Co. will also act as consulting accountants to the group. This follows the announcement last month that group profits had dropped from £396,796 for 1950 to £71,752 for 1951.

Garrard Engineering and Manfg. Co.

Operations in the year to January 31 last resulted in a net profit of £56,311 (*£64,120*) after taxation of £78,447 (*£72,007*). The final dividend is 11%, making 21% (*25%*) on enlarged capital.

G. N. Haden and Sons

For 1951, the group trading profit, after all charges including provision for pensions £10,000 (*nil*), but before taxation, is £159,816 (*£163,579*). Taxation absorbs £101,371 (*£93,123*). The dividend is again 12½%.

W. T. Henley's Telegraph Works Co.

The new issue of capital, to which earlier reference has been made, is a rights issue of 3,250,000 5s. shares at 14s. 6d. each, offered to Ordinary holders in the proportion of one for every 10s. nominal stock held. The company is also making a 100% Ordinary bonus issue by capitalising £2,437,000 of reserves, C.I.C. permission having been obtained.

Johnson & Phillips

The issue of 4½% Preference shares, amounting to £1,000,000 nominal value, during the year, had enabled the company to finance the continually expanding business for the time being, but they were again finding that further cash capital was required in the business. Mr. G. Leslie Wates, chairman and joint managing director, stressed at the annual general meeting recently.

Oriental Telephone and Electric Co.

For 1951, the group profit, after all charges, including taxation, is £106,839 (*£103,303*), all of which is attributable to the holding company. The final Ordinary dividend is 12%, again making 16% for the year. The U.K. taxation charged is £17,013 (*£39,536*). There is £75,342 (***£75,316***) carried forward.

Parnall (Yate) Ltd.

Sales and trading results of the parent company showed a considerable improvement over those of 1950, Lord Limerick remarks in his statement. But so far in 1952 the total sales of the group are slightly below those for the same period of 1951. This is due firstly, to the restricted Australian imports, and secondly to the increasing rearmament work, which has to some extent curtailed normal commercial activity.

Power Securities Corpn Ltd.

Consolidated profit from contracts and other income for 1951 is £513,076 against £425,866 for the previous year. With investment income added, the total becomes £535,336 (*£440,166*). The consolidated net profit is £140,485 (*£141,625*), after charging depreciation, £117,765 (*£81,233*) taxation £242,742 (*£179,886*), etc. With £104,774 (*£113,685*) brought in there is £256,585 (*£258,359*) available. To pensions £5,650 (*same*), contracts reserve £30,000 (*£20,000*), general reserve £70,000 (*£64,335*), and for payment of the Ordinary dividend of 6%, there is £107,360 (*£104,774*) carried forward.

Siemens Brothers & Co. Ltd.

After all charges, including taxation, the group net profit for 1951 is £579,942 compared with £529,716 for the previous year. U.K. taxation absorbs £800,328 (*£656,652*). An Ordinary dividend of 7½% and a cash bonus of 2½% are again recommended. Transfers to reserves total £374,020 (*£320,874*). An increase in the authorised capital and a rights issue to shares is proposed. It is intended to increase the present capital of £4,000,000 by the issue of 1,250,000 £1 shares, the greater part of which will be offered to Ordinary holders.

Telephone Rentals

For 1951, the consolidated rental revenue was £1,463,940 (*£1,293,199*), increased by other income to £1,606,033 (*£1,433,978*). After operating costs, depreciation, etc., the profit is £549,516 (*£480,935*), plus provision for supplemental provisions not required £10,000 (*nil*). Taxation takes £279,244 (*£241,699*), to general reserve £202,769 (*£30,000*), employees' participation scheme £53,765 (*£48,351*), minority interests £1,358 (*£1,402*), leaving £131,648 (*£176,782*) carried forward. The C.I.C. has again rejected the company's application to raise up to £500,000 to expand its internal telephone-hire system to industry.

B. S. & W. Whiteley Ltd.

Group profit for the year to March 31 last is £92,812 (*£107,420*) after taxation of £105,953 (*£113,026*). The dividend is 30% on capital increased by 300% shares bonus (*100% on smaller capital*).

Dividends Declared

Brecknell, Munro and Rogers.—Interim of 10% (*same*).

R. A. Lister and Co.—Interim of 2½% (*same*).

Commercial Information

CONTRACTS OPEN

HOME

June 9.—Durham. Installation of 34 street lighting units in New Elvet, Hallgarth St. and Church St., and nine fluorescent units in Saddler St. City Engineer, Town Hall. (See May 8 issue.)

June 9.—Easthampstead (Berks) R.D.C. Installation of wiring and fittings in 16 houses at Sandhurst, 22 at Bracknell, 12 at Warfield, 10 at Winkfield, and 4 at Crowthorne. Engineer and Surveyor, Council Offices, Church Rd., Bracknell. Deposit £1 1s.

June 9.—Enfield U.D.C. Supply of (*a*) 132 lanterns for 140 W sodium vapour lamps with lamps, control gear and fuses; and (*b*) 132 concrete columns and fixing of lanterns, etc. Council's Engineer and Surveyor, Frank Lee, 7 Little Park Gardens. Deposit £1 for each section.

June 9.—Holland. Installation of electricity at Boston St. Thomas school. County Architects, County Hall, Boston, Lincs.

June 9.—Marshland (Norfolk) R.D.C. Wiring of 52 houses and 4 bungalows. S. G. Bailey, architect, Council Offices, Alexandra Rd., Wisbech.

June 9.—North Walsham (Norfolk) U.D.C. Electrical installation at White Horse Common, U.9, comprising 40 lighting points. J. A. Yates, Surveyor, Council Offices, New Rd. Deposit £1 1s.

June 9.—Stocksbridge U.D.C. Provision of electrical installations in 93 houses on Wilson Rd., Shay House and Royd estates. Council's Surveyor, D. E. Robinson, Town Hall, Stocksbridge, Sheffield.

June 11.—Merthyr Tydfil T.C. Supply of equipment for electrical engineering laboratory and electrical installations workshop for College of Further Education. T. S. Evans, Town Clerk, Town Hall.

June 11.—Wandsworth B.C. Erection of 253 lamp columns in group A; supply and erection of 253 sodium lanterns in group A and five lanterns and columns in group B. Borough Engineer, Municipal Buildings, Wandsworth, S.W.18.

June 12.—Seaham (Dur.) U.D.C. Electrical goods needed for year's maintenance of about 3,500 houses. Housing Manager, Estate Office, Deneside, Seaham.

June 13.—Limerick. Supply of protected type electric power units to drive various items of quarry plant, and suitable for 3-phase, 380 V, standard frequencies, 50 c/s. County Council Secretary, 82 O'Connell Street.

June 14.—Chadderton U.D.C. Materials and works in new street lighting scheme comprise (*a*) supply of 49 lanterns, transformers, capacitors, time switches, fuses for 140 W sodium lamps; (*b*) supply of 49 concrete columns 25 ft high; and (*c*) erection of those columns. Engineer and Surveyor, Town Hall. (See May 29 issue.)

June 14.—Cork (Eire). Electrical installation in buildings at hospital at Loto, Granmire. Nicholas Mathews, Consulting Engineer, 42 Fitzwilliam Pl., Dublin. Deposit £10 10s.

June 14.—Royton (Lancs.) U.D.C. Provision of street lighting comprising erection of lamp columns and jointing, servicing and connection of those columns in Shaw Rd. and Broadway. Engineer and Surveyor, Town Hall.

June 16.—Bristol. Supply of electrical stores for year ending June 30, 1953, for Cossham and Frenchay Hospital Management Committee. Secretary, Frenchay Hospital, Bristol.

June 16.—Ceiriog (Denbigh) R.D.C. Electrical installation in 40 houses and six shops with flats on Rhosywaen site, Chirk. R. W. Aubrey, Surveyor, The Mount, Chirk. Deposit £1 1s.

June 16.—Fife. Electrical work in public health clinic at Cowdenbeath. Surveyors are Robt. Calbreith and Lawson, 21 Crossgate, Cupar.

June 16.—Oldbury T.C. Provision and erection of 26 concrete street lighting columns with time switches, h.p.m.v. discharge lamps in Class A, and for fixing only of lanterns and auxiliary equipment. Borough Surveyor, Municipal Bank Chambers. Deposit £2 2s.

June 16.—Romford T.C. Street lighting included in various works in Ferndale and Mowbray Roads. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s.

June 17.—Worthing (Sussex) R.D.C. Installation of electricity in 40 houses at Sompting (Contract A); 49 at Augmering (Contract B); and 46 at East Preston and 16 at Rustington (Contract C). Housing Manager, 15 Mill Rd. Deposit £1 1s.

June 18.—Burton-on-Trent T.C. Replacement of 43 lamps and conversion from gas to electricity in various streets. Borough Surveyor, Town Hall. (See May 22 issue.)

June 18.—High Wycombe T.C. Supply and erection of (*a*) steel columns (from stock) and installation of auxiliary equipment, lanterns and wiring, etc.; and (*b*) supply of lanterns, 400 W mercury lamps and sets of auxiliary apparatus for street lighting along trunk roads A.40 and A.4010. J. A. Parkinson, Borough Engineer and Surveyor, Municipal Offices, Queen Victoria Rd. Deposit £2 2s. (See May 22 issue.)

June 20.—Belfast. Supply of electrically wound solar dial time switches. Electricity Dept., East Bridge St. (See May 29 issue.)

June 20.—Londonderry. Complete electrical installation at Garvagh House. J. R. W. Murland, Consulting Engineer, 13 Wellington St., Belfast. Deposit £3 3s.

June 20.—Rochdale T.C. Lighting and power installation at Baillie St. school. Tenders to Town Clerk, Town Hall.

June 23.—Finchley T.C. Supply of (*a*) 152 lanterns for 140 W sodium vapour lamps, with lamps, control gear and fuses; and (*b*) 152 concrete columns and fixing of lanterns, etc. P. M. Spencer, Borough Engineer and Surveyor, 294-6 Regents Park Rd., N.3. Deposit £2 for each section.

June 23.—Manchester. Supply of electric machines and machine tools for Newall Green Secondary School, Wythenshawe. City Architect, Town Hall. Deposit £1 1s.

June 23.—Wanstead and Woodford B.C. Installation of 160 W blended lighting in Group B on 23 routes. Included: (*a*) provision of lanterns, control gear and fittings for extension and conversion to electric lighting of about 270 existing gas columns and same for about 100 gas columns; and (*b*) provision and erection of about 70 concrete columns with lanterns and control gear. Borough Engineer and Surveyor, Municipal Offices, High Rd., Woodford, E.18. Deposit £2. (See May 22 issue.)

June 23.—Wolverhampton T.C. Supply and erection of sodium and mercury lighting including columns, lanterns, control gear and time switches for street lighting on class A and B roads. Borough Engineer, Town Hall. Deposit £2 2s. (Advertised in this issue.)

June 24.—Birmingham. Electrical installations at Quinton Rd. West Police Station. H. J. Manzoni, City Engineer and Surveyor, Civic Centre, Birmingham 1. Deposit £2 2s.

June 24.—Grimsby T.C. Electrical installation in erection of Western primary infants school at Littlecoates. J. V. Oldfield, Borough Engineer and Surveyor, Municipal Offices, Town Hall Square. Deposit £5.

June 27.—Norton R.D.C. Electrical work in houses at Burythorpe and Kennythorpe, near Malton. R. W. Clayton, Architect to Council, Welham Road.

June 30.—Stockport T.C. Rewiring, lighting and electrical installation at Town Hall. Wm. F. Gardner, Borough Surveyor, Town Hall. Deposit £5 5s. (See May 29 issue.)

July 7.—Ashbourne U.D.C. Supply and erection of 28 140 W sodium lamps, and 70 150 W tungsten all complete with standards for street lighting. Engineer and Surveyor, King Edward St. Deposit £1 1s. (Advertised in this issue.)

July 7.—Dublin. Electrical installation at Dublin Regional Sanatorium, Blanchardstown. P. D. Cinneide, Dept. of Health, Custom House. Deposit £20.

July 7.—Leeds. Supply, erection and maintenance of an electrically driven centrifugal pump with capacity of 1,400 galls. p.m. General Manager and Engineer, Waterworks Dept., Civic Hall.

July 16.—Gloucester. Supply and installation of two electrically driven well pumps at Newent station. Pumps to be driven by shafts from vertical motors on surface. J. H. Goodridge, City Surveyor and Water Engineer, 21 Eastgate St. Deposit £2 2s. (See May 29 issue.)

No date stated.—Southampton. Supply of six electrically driven pumps for installation at proposed pumping station, Chapel. Details from Borough Engineer, Civic Centre.

OVERSEAS

Details of items marked may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

June 21.—Formosa. Central Trust of China requires supply of a total of 14,000 dry batteries to various specifications. Trust is at 68 Yen Ping Nan Lu, Taipoi, Taiwan. B.o.T. (Ref. CRE 18575/52).*

June 25.—Australia. Victorian Railway Commissioners require supply of one horizontal boring machine with accessories and electrical equipment for use in railway workshop. Room 191, Railways Admin. Offices, Spencer St., Melbourne. B.o.T. (Ref. CRE 19301/52).*

June 25.—India. Supply of equipment for extension of trolleybus line from Kabli Gate to Queen Garden and back by two routes, including bare copper conductors, insulators, poles and attachments. Details from General Manager, Delhi Transport Service, Seindie Hse., New Delhi. B.o.T. (Ref. CRE 17414/52).*

June 26.—South Africa. Supply of four 11·5 kV circuit-breakers and three 3-phase to single-phase transformers for S. African Railways. Chairman of Tender Board, P.O. Box 7784, Johannesburg.

June 26.—South Africa. Supply of 58 electric hoists for S. African Railways (Stores Dept.) —supply is 3-phase a.c. neutral earthed 380/220 V. Chairman of Tender Board, P.O. Box 7784, Johannesburg. B.o.T. (Ref. CRE 19622/52).*

June 26.—India. Director General Supplies and Disposals, Shahjahan Rd., New Delhi, invites tenders for supply of large quantities of various types of telephone cables. B.o.T. (Ref. CRE 18505/52).*

July 2.—South Africa. Supply of distribution transformers under specification No. LS 3/1952, for municipality of Livingstone. Consulting Engineer, J. S. Clinton, P.O. Box 4648, Johannesburg. Deposit £3 3s.

Your Queries — Answered

"Zeros" refrigerators, address for spares? J.E.—Time Engineers, Ltd., 60 Southend Rd., Rainham, Essex. (23107)

"Hetco" hairdryers, makers of? A.B.—Henry E. Taylor, Ltd., 13-15a, Queensway, Enfield, Middx. (23115)

"Duplextra" twin sanders, makers of? L.E.—Electrona Electrical Products, Ltd., Eider House, Ducie St., Manchester 1. (23128)

"Gloria" vacuum cleaners, address for spares? E.D.—Spares are likely to be available from the Sterling Eng. Co., Ltd., Sterling Works, Dagenham. (23134)

"Silex" steam iron, London agent? L.B.—S. Lesser and Sons (1928), Ltd., Mare St., E.8. (23147)

"Royce" washing machines, suppliers of? T.E.—Fleet Electrics, Ltd., 32 Willesden Lane, N.W.6. (23154)

"Humex" greenhouse humidifier, makers of? S.D.—Roberts Electrical Co., Ltd., 98-100 Lavender Hill, Battersea, S.W.11. (23163)

"Tramsen" hair clippers, suppliers of? B.C.—We presume this refers to "Fransen"—J. A. Fransen, Ltd., 6 Ryefield Crescent, Northwood Hills, Middx. (23178)

The above are selected from questions we have answered this week. If you have a query, send it to us.

July 7.—India. Supply of two single operator diesel engine driven portable arc welding sets —300 A. Tender forms (Rs. 5) from Director General, Supplies and Disposals, Shahjahan Rd., New Delhi.

Aug. 8.—Australia. Brisbane City Council invites tenders for supply of 33 kV cable, pilot cable and jointing material. Copies of specification may be had from Chief Engineer and Manager, Dept. of Electricity, Kelvin House, Adelaide St., Brisbane. Cost 10s. 6d. B.o.T. (Ref. CRE 18050/52).*

Aug. 27.—Australia. State Electricity Commission of Queensland, Scottish Union House, Eagle St., Brisbane, invites tenders for manufacture, supply and maintenance of two transformers each for Wide Bay-Burnett, and Capricornia electricity boards, and four for Townsville board. B.o.T. (Ref. CRE 19173/52).*

No date stated.—Australia. First stage to begin of proposed 3,000 MW hydro-electric development of Snowy, Murray and Tumut Rivers, and tenders invited for supply, erection and maintenance of generators and turbines comprising four 3-phase 50 c/s vertical shaft Francis-type water wheel-driven generators each having continuous maximum rating of 80,000 kW for power station on Tumut River by Snowy Mountains H.-E. Authority. London office: 18 St. George St., Hanover Sq., W.1. Closing date for tenders expected to be in October.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Wednesday morning)

	£ s. d.	New York price
COPPER, electrolytic	231 0 0	£220 0 0
LEAD, good soft pig (foreign)	129 0 0	120 0 0
" "English" quality	130 10 0	
TIN (99-99.76%) (Cash)	974-975	—
" (3 months)	965-966	—
ALUMINIUM, commercial purity (del.)	154 0 0	—
ZINC	150 0 0	220 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	57 10 0	—
Mild Steel Tape (0.04 in.)	39 15 0	—

TRADE NOTES

Fire. Runbaken Electrical Products, Ltd., inform us that their Manchester warehouse stock, showrooms and purchasing department were destroyed by fire recently, but fortunately this has not completely disorganised despatch from the warehouse. There may be delays in one or two small items, but the majority of supplies are about normal, they state.

N.Z. Imports. Having examined objections to the proposed exemption from import licensing of certain goods, the New Zealand Board of Trade has decided not to recommend decontrol until after a review of the tariff duties on items which includes insulator bolts up to 24 in. long, wireless set and chassis.

Zinc. The Ministry of Materials has announced that as from June 4 the price of good ordinary brand zinc has been reduced from £166 to £150 per ton delivered.

CONTRACTS PLACED

B.E.A. Two 180,000 lb/hr boilers at Woolwich, John Thompson Water Tube Boilers Ltd.; Coal handling plant, John Thompson (Wolverhampton) Ltd.; Coal cranes, Stothert and Pitt Ltd.; and ash and dust handling plant at Marchwood, near Southampton, Babcock and Wilcox Ltd.; Two 540,000 lb/hr boilers at Tilbury, John Thompson Water Tube Boilers Ltd.; Six boiler feed pumps at Castle Donington, Mather and Platt Ltd.; Two electrostatic precipitators at Drakelow, Burton-on-Trent, Sturtevant Engineering Co , Ltd.; 132 kV 2,500 MVA switchgear at Carmarthen Bay, Burry Port, Ferguson, Pailin Ltd.; Circulating water pumps at Stella South, Gwynnes Pumps Ltd.: Three 150,000 lb/hr boilers at Blackburn, Simon-Carves Ltd.; Generator transformers at Clyde's Mill, Bruce Peebles and Co., Ltd.; 66 kV, 11 kV and auxiliary cables between Fulham-Wandsworth and Narroy Road-Roehampton, British Insulated Callender's Cables Ltd.; 132 kV overhead line, Nursling-Velmore, W. T. Henley's Telegraph Works Co., Ltd.; 3,500 MVA, 132 kV switchgear, at Slough (New Denham), Bucks, A. Reyrolle and Co., Ltd.

Ashton-under-Lyne T.C. Wiring of 178 houses on Taunton estate, Hobson and Scott Ltd., £4,358.

London C.C. Electrical installation at Canonbury primary school, Buchanan and Curwen Ltd.; at John Burns primary school, Alexander Hawkins and Sons Ltd.; and at Flint St. primary school, Artisans (Electrical) Ltd.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

John V. Barke Ltd., 98A High St., Saltney, Chester, electrical engineer and contractor. Meetings of creditors and contributories will be held tomorrow (Friday) at Official Receiver's Office, W. Africa House, 25 Water St., Liverpool, at 11 a.m. and 11.30 a.m. respectively.

Riley and Peirson (Electrical) Ltd. Meetings of members and creditors will take place at Armitage, Smith, Jackson and Co., York House, 3 Alfred St., Boar Lane, Leeds, on July 5, at 10.30 a.m. and 11 a.m. respectively, to receive liquidator's report.

Albert C. Hands and Sons, electrical wholesalers of 74 Audrey House, Ely Place, London. Partnership between Percy H. Hands and Albert Sheldon Hands dissolved as from May 21. All debts received and paid by the said P. H. Hands and A. Sheldon Hands.

BANKRUPTCY ACTS

First Meeting

Carlisle. George S. Graham, trading as electrical engineer at Blackfriars St., Carlisle. First meeting today (Thursday) at Official Receiver's Office, 14 Lowther St., at 2.30 p.m., and public examination at County Court Offices, 39 Lowther St., Carlisle, on July 14, at 2.30 p.m.

Release of Trustee

Salford. Arthur Smith and James Smith, electrical contractors trading as J. and A. Smith, at 550 Bolton Rd., Pendlebury. Trustee was F. C. Ormrod, Official Receiver, 20 Byron St., Manchester.

Receiving Order

Guildford. Ronal H. Winslade, electrical engineer of 21 Park Rd., Aldershot. Date of order, May 26.

BUSINESS PROSPECTS

HOME

Abingdon R.D.C. It is proposed to build 150 houses this year and 110 next. Air Ministry want 150 houses built at Milton, and application to be made to borrow £28,785 for houses at Kennington.

Ashton-in-Makerfield U.D.C. Thirty houses and 32 flats to be erected on Landgate Lane site.

Atherton (Lancs) U.D.C. Four blocks of flats to be built on Hag Fold estate. J. C. Prestwich and Sons, architects, Bradshawgate Chambers, Leigh.

Barrow-in-Furness T.C. Approval sought for extension to Ormsgill estate providing for 135 houses.

Biddulph (Staffs) U.D.C. Coal Industry Housing Association is to erect 300 houses on Park Lane estate. Scheme hoped to be completed next year.

Billericay U.D.C. 150 houses to be built in Pound Lane area, Laindon.

Birkenhead. Plans in hand for development of new estate providing for 330 houses. It is hoped to begin work before end of this summer.

Birmingham. B.R. to carry out renovations at New St. station.

Bromley T.C. Tenders expected to be invited shortly for erection of 8 shops and 30 old persons' dwellings on Hayes Pl. estate. Also C. W. Fox, 22 Parkway, Welwyn Garden City, is architect for erection of 108 houses.

Buckinghamshire. School building programme, which involves seven schools has been approved.

Bury. Approval given for erection of infant section at Walmersley primary school and for Bury High School biology laboratory.

Carlton U.D.C. Erection of 28 dwellings off Foxhill Rd. J. R. Campbell, Engineer and Surveyor, Council House, Burton Rd., Carlton.

Chelmsford T.C. Negotiations in hand for erection of 84 houses on Melbourne estate. Plans approved for 24 houses in Van Dieman's Lane for J. W. Seager, 133 Mildmay Rd.

Coleraine T.C. Plans approved for erection of 66 dwellings at Hazelbank for N. Ireland Housing Trust.

Crook and Willington U.D.C. Permission received to build 100 houses at Wear Valley View. Future plans include 100 houses on Old Wheatbottom site, and 72 at Low Willington. Council's Architects are T. A. Page, Son, and Hill, 75 King St., South Shields.

Cumberland. A £95,000 scheme for a secondary school at Penrith has been included in current building programme.

Doncaster. Pite, Son and Fairweather, 6 Queen Anne's Gate, London S.W.1, are architects for extension to Royal Infirmary and erection of new maternity annexe.

Douglas T.C. Tenders to be invited for relighting and rewiring of Douglas markets and cellars.

Dublin. Scheme to go ahead for construction of 900 houses on St. Anne's estate, Clontarf.

Durham R.D.C. Twenty bungalows to be built at Kelloe and 30 houses at Bear Park.

Easington R.D.C. Erection of 196 houses is being planned. 56 will be built at Thornley. Surveyor is R. Lumsden.

Edinburgh. Erection of 208 houses in Inch Housing Area B. City Architect, City Chambers.

Esher (Surrey) U.D.C. Plans approved for erection of 68 houses in Faraday Rd., West Molesey.

Egham U.D.C. Construction of 50 houses on Thorpe Rd. estate. Engineer and Surveyor, Fire Station Buildings, High St.

Farnborough (Hants) U.D.C. Approval received for erection of 46 houses on Fox Lane estate.

Glasgow. Erection of shops, flats and maisonettes at Cranhill. Director of Housing, Architect's Section, 20 Trongate.

Glasgow. Home Dept. approved erection of £35,000 police station in Barrhead Rd.

Grantham T.C. It is proposed to erect 17 bungalows in Grange Gardens and 32 houses in Princess Drive.

Great Yarmouth. Gt. Yarmouth Shipping Co. Ltd. are to rebuild their offices at South Quay. J. R. Chaplin, Architect, The Close, Norwich.

Halifax T.C. Construction of 106 houses in three contracts on Yews Farm estate. Borough Engineer, Town Hall, Barnsley.

Hampshire. Revised scheme submitted for replacement of gas lighting at Andover grammar school by electricity. Estimated cost, £1,875.

Henley. Plans approved for 70 houses at Abraham's Allotments and 66 houses at Newtown Allotments.

Leicester. Permission received to build 1,500 houses on Eyres Monsell estate, Glen Parva.

Litherland U.D.C. Erection of 96 flats in Linacre Rd. Quiggin and Gee, chart. architects, Harley Bldngs., 11 Old Hall St., Liverpool.

Middlesbrough T.C. About £56,000 is to be spent this year on electrical work. This includes £35,000 on housing schemes, £10,000 for street lighting and over £9,000 on public buildings.

Oswaldtwistle (Lancs) U.D.C. Further 20 houses and 7 bungalows to be built to complete Grove St. scheme.

Potters Bar (Middx) U.D.C. Plans approved for 56 houses and 24 maisonettes in Oakmere scheme, stage 3.

Rowley Regis T.C. Erection of 86 houses on Cox's Farm estate. Borough Engineer and Surveyor, Municipal Bldngs., Old Hill.

Sale T.C. Erection of 40 dwellings on Oaklea Farm estate. Borough Engineer, Town Hall.

Salisbury. Construction of 36 houses on Bemerton Heath estate. City Engineer, The Council House, Bourne Hill.

Sheffield. Erection of Holt House primary school at Abbeydale. W. Geo. Davies, city architect, Town Hall.

Spalding R.D.C. Tenders will shortly be invited for installation of electricity in 16 houses at Gosberton and Quadring Westhorpe and two at Quadring Bank. Also a total of 38 houses to be built in district, as well as 26 at Surfleet. Council's Engineer and Architect, Spalding, Lincs.

Shrewsbury T.C. Erection of 95 and 70 houses under separate contracts on Meadows estate. F. R. Dinnis, Borough Surveyor, Guildhall.

Stanley (Dur). Cordingley and McIntyre, The College, Durham, are architects for proposed £15,000 church at South Stanley.

Stockport. Works extensions have been planned by J. J. Greig Ltd. in Heaton Lane and

Business Prospects—contd.

by Stockport Motor House Ltd. at Heavily.

Warwickshire. Approval sought by C.C. for extensions to Nuneaton Manor Park secondary school at estimated cost of £41,000. Also school building programme recently approved involves eight schools.

West Riding. Extensions to Percy Jackson grammar school, Adwick-le-Street, are estimated to cost £40,000. County Architect, County Offices, Wakefield.

Worcester. Erection of 48, 18, 8 and 8 houses under four contracts on Dines Green estate. City Engineer and Surveyor, 22 Bridge St.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Amplivox. 706,140. Class 9. Telephone instruments, headphones and units incorporating a volume control for plugging headphones into radio receiving sets. Amplivox Ltd., 2 Bentinck St., Manchester Sq., W.1.

Marconiphone. 702,272. Class 9. Electric storage batteries. The Marconiphone Co. Ltd., Blyth Rd., Hayes, Middx.

Polarslab. 704,680. Class 11. Refrigerated counters for displaying and serving food; and **Sunglow.** 704,682. Class 11. Heated counters for displaying and serving food, sold complete. Gardiner and Gullard Ltd., Garland Works, Hither Green Station, S.E.13.

Toddles. 706,306. Class 9. Wireless, television, cinematographic apparatus and instruments. H. M. Sutcliff, 155 Stockport Rd., Ardwick, Manchester 13.

Stow-a-Way B688,915. Class 7. Washing and ironing machines, Thor Corpn., 2115 South 54th Ave., Chicago, Illinois.

Marcol. 704,437. Class 9. Instruments and apparatus; wireless sets (complete), etc. M. A. Rapport and Co., Ltd., Ivor Hse., Bridge St., Cardiff.

Lectroflash. 706,071. Class 9. Electric condensers (capacitors). Telegraph Condenser Co., Ltd., Wales Farm Rd., London, W.3.

W. T. HENLEY'S TELEGRAPH WORKS

New Ordinary Share Issue

THE annual general meeting of W. T. Henley's Telegraph Works Company, Ltd., was held on May 30 in London.

Sir Montague Hughman, the chairman, in the course of his speech, said: The year 1951 was a period of great activity in the Henley Organisation and our business continued to expand in almost every direction, both at home and abroad. On January 1, 1952, the orders in hand for the group amounted to approximately £7,000,000, against approximately £5,000,000 a year earlier. While none of us can foretell what the rest of the year will show, for the first four months of 1952 turnover shows an increase over the corresponding period of last year.

Record Turnover

We are carrying out our full share of rearmament work, which type of work naturally absorbs throughout the country large quantities of raw materials. During the last year the shortage of essential materials prevented us from carrying out many orders and that, unhappily, is still true.

One of our worries is to finance our large and expanding business with prices of materials still reaching extraordinarily high figures, labour and overhead expenditure continuing to rise, and costs of replacing machinery and plant showing an enormous increase. With our present capital structure, and notwithstanding the profits ploughed back into the business for many years, we find ourselves short of cash, like practically every other manufacturing firm.

During 1951 we had a record turnover—and do not forget Henley started this business 115 years ago—and while some of this is due to the increased cost of materials, we showed an increase in volume output over 1950.

Finance Proposals

The net profit for the year is £534,000. The capital employed in the business has increased during the year by nearly £400,000 to £8,700,000 odd. The total group net profits earned amounted to £646,447, approximately £39,000 less than the profits earned in 1950.

Since the last issue of capital in April, 1948, the growth of the business of your company and of its subsidiary and associated companies has continued over substantially the whole range of the group's products, and a further large expansion has been caused by the Government rearmament programme. The developments which have taken place and which are still to take place call for further finance, which your directors have decided should be provided in permanent form.

The Capital Issues Committee's consent has been obtained to an issue of 3,250,000 new Ordinary shares of 5s. each, which will be offered in the first instance to the holders of the existing Ordinary stock at the close of business on May 19, 1952, in the proportion of one new share for 10s. of Ordinary stock. These shares will be converted into stock when issued and fully paid. I anticipate that in the absence of unforeseen circumstances, the company will be able to maintain, on the capital as increased by the issue of shares now offered, the same rate of dividend and bonus for the year 1952 as you have received in 1951 on the then smaller capital.

Bonus Issue

Your directors have also had under consideration the advisability of bringing the issued capital of the company more into line with the actual value and earning capacity of the assets employed. In this connection the Capital Issues Committee's consent has been obtained to the capitalisation of £2,437,500 of reserves which, when the 3,250,000 shares referred to above have been issued, are fully paid, and have been converted into stock, will be applied in paying up in full 9,750,000 unissued Ordinary shares of 5s. each for distribution among the Ordinary stockholders on the basis of one 5s. Ordinary share for each Ordinary stock unit of 5s. then held. These 5s. shares will then be converted into stock and consolidated with the then existing Ordinary stock units of 5s. each into units of 10s. each.

In the near future a further meeting of stockholders will be called to authorise the increase in the capital of the company necessary to put this decision into effect and to approve the proposed capitalisation of reserves.

The report was adopted.

BRUSH ELECTRICAL ENGINEERING COMPANY

(BRUSH ABOE GROUP)

Sir Ronald W. Matthews on the widespread demand

THE 63rd annual general meeting of The Brush Electrical Engineering Company Limited, was held on May 29 in London, Sir Ronald W. Matthews, D.L., M.Inst.T. (the chairman) presiding.

The following are extracts from his circulated statement:

The orders we have received in 1951 totalling over £40,000,000 (which is more than double the previous record figure of 1950) show that sales have presented no serious problem. We have accordingly been able to effect some economy in our selling costs. Armament orders and exports have naturally taken priority.

Having dealt at length with the consolidation of the Group organisation and the widespread manufacturing activities, the statement continues:

The products of our Group of Companies are in demand over a very wide field.

Close Contact with Overseas Customers

The network of overseas agents has been further strengthened by additional appointments, with a consequent increase in the availability of technical service and supply of spare parts on a world-wide basis. The policy of setting up, in the immediate post-war period, a number of subsidiary companies in essential overseas markets has been well rewarded, and has resulted in much closer contact with the agents and customers abroad.

The Group now supplies over one-third of the total British exports of Diesel engines and Diesel electric generating sets. Indeed, this proportion is very much higher in a number of individual overseas markets where industrial, agricultural and municipal users have come to rely on our power plant to meet much of their requirements.

Our established policy has been followed in extending our resources for scientific investigation with the object of increasing the contribution which our laboratories can make towards improved production and higher quality.

Twelve months of intensive labour in the fields of research, development and production have established even more firmly the position of the Group throughout the markets of the world. It has not been an easy year, nor can we be justified in anticipating an easier passage in the months that lie ahead, but I have every confidence in the ability of the management to grapple successfully with problems as they arise.

The report and accounts were adopted.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Harold Elliott Ltd., 8 York St., Clitheroe, Lancs. Electricians, mechanical engineers, etc. Cap.: £2,000. Dirs.: H. Elliott and K. C. Holt.

Instrument Rentals Ltd. Making, selling, letting out on hire or hire purchase of telephone recording, telephonic, recording and electrical and electronic apparatus, etc. Cap.: £100. Dirs.: to be appointed by subscribers. Subs.: Betty Wilson, 53 Finsbury Park Rd., N.4 (secy.), and D. C. Langford, 28 Lincolns Inn Fields, W.C.2.

J. T. Jarvis and Son Ltd., 59 Bell St., Wolverhampton. To take over business of electrical engineers carried on as "J. T. Jarvis and Son" at Wolverhampton. Cap.: £5,000. Permt. dirs.: J. T. Jarvis, J. T. Jarvis and Lilian A. Jarvis.

R. D. Lockett Ltd., St. Helens Rd., Bolton. Electrical engineers and contractors, manufacturers of and dealers in electrical components, etc. Cap.: £4,000. Dirs.: R. D. Lockett and J. Wolstencroft.

Platt and Brown Ltd., 104 Station Rd., Ainsdale, Southport. To take over business of electrical contractors carried on as "Platt and Brown" at Ainsdale, Southport. Cap.: £5,000. Dirs.: E. Platt and G. C. Brown.

Perry Clamps Ltd., 90 Church St., Birkenhead, Ches. To acquire from Cable Covers Ltd. the benefit of or right to use any existing invention relating to an improved method and apparatus for joining wire cables or of forming an eye on a single cable (known as "The Talurit Process"). Cap.: £8,000. Dirs.: F. H. Lowe and R. T. Wilcox.

Refrigeration (Chingford) Ltd., 52 Sewardstone Rd., Chingford, E.4. Manufacturers and wholesale and retail suppliers of refrigerators, etc. Cap.: £500. Dirs.: W. J. Davey, G. Witcher and E. K. Jackson.

Storr and Townsend Ltd., 62 Jubilee Crescent, Coventry. To take over business of electrical contractors, television engineers and salesmen carried on at Coventry by Wm. H. Storr and Richard J. Townsend. Cap.: £2,500. Dirs.: W. H. Storr and R. J. Townsend.

Supac Electrical Co. Ltd., 25 Edwardsville, Treharris, Glam. Manufacturers of and dealers in batteries, motors, dynamos, etc. Cap.: £6,000. Dirs.: T. H. Morgan, J. Ward and E. Jones.

TOK Electrical and Industrial Mechanisms Ltd. Cap.: £100. Dirs.: not named. Subs.: W. G. Tullett, 6 Reed Pond Walk, Gidea Park, Essex, and G. Krivochief, 3 Hanger Court, W.5.

MEETINGS TO NOTE

MONDAY, JUNE 9

I.E.E. (Western Centre).—Annual meeting at Edison Swan works, Gloucester, 2 p.m.

TUESDAY, JUNE 10

Incorp. Plant Engrs. (London).—"Boiler Water Conditioning: particularly priming and foaming and difficulties due to carry-over." G. S. Irving. Royal Soc. of Arts, 7 p.m.

WEDNESDAY, JUNE 11

N. Western Fuel Luncheon Club.—"Intelligent Use of Electricity for Domestic Space Heating." J. L. Rycroft. Engineers' Club, Albert Sq., Manchester, 12 noon.

THURSDAY, JUNE 12

Incorp. Plant Engrs. (Newcastle-on-Tyne).—"Feedwater Treatment." Roadway House, Oxford St., 7.30 p.m.

MONDAY, JUNE 16

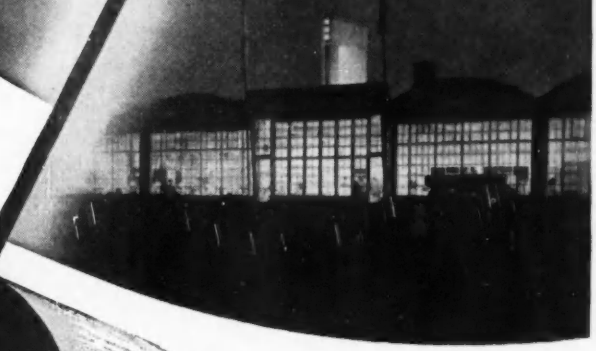
British Electrical Power Convention.—Opens to-day at Bournemouth, continuing until June 18.

Incorp. Plant Engrs. (Liverpool and N. Wales).—"Carbon in Engineering." C. D. Adshead. Radiant House, Bold St., Liverpool, 7.15 p.m.

In their fine new factory at Dunmow, Essex, Messrs. Butcher & Son Ltd. used HENLEY CABLES exclusively for the electrical installation. Messrs. Butcher, in addition to their business of agricultural and general engineers and manufacturers, make extensive use of HENLEY CABLES in their electrical contracting service. Whether the current is carried by day or night, it pays to specify HENLEY.

Architect: Basil I. Briggs, A.R.I.B.A.

Day and Night



HENLEY CABLES

carry the current

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53, HATTON GARDEN, LONDON, E.C.1.

CATHODIC PROTECTION against CORROSION

This photograph is reproduced by the courtesy of the Iraq Petroleum Co., Ltd.

IN any buried pipe or structure, unprotected parts suffer disintegration due to the passing either of galvanic currents set up by the structure itself, or stray currents picked up from the surrounding soil. The Westinghouse Constant Current System prevents this by passing a current into the structure at these points, thereby preventing corrosive action.

This Westalite system is designed to provide a constant current so that, once adjusted, *it will maintain the desired value* of current irrespective of variations in local soil conditions.

The large illustration shows part of the 556-mile Iraq Petroleum Company pipeline being laid between Kirkuk, Iraq, and the terminal at Banias, Syria. This pipeline is protected against corrosion by the . . .

WESTINGHOUSE

WESTALITE

CONSTANT CURRENT SYSTEM

One of the equipments used in this contract is shown in the circle.

For full details write to Dept. E.T.11.

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., 82 York Way, King's Cross, London, N.1

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF WOLVERHAMPTON

STREET LIGHTING

GROUP "A" AND "B" ROADS

TENDERS are invited for the INSTALLATION of sodium and mercury lighting, including the supply and erection of columns, lanterns, auxiliary control gear and time switches.

Plans and general conditions of contract may be inspected, and specifications, bill of quantities and form of tender may be obtained on application to the Borough Engineer, Town Hall, Wolverhampton, on payment of a deposit of two guineas, which will be returned on receipt of a bona fide tender and all documents.

Tenders, enclosed in a plain sealed envelope and endorsed "Street Lighting," must be delivered to the undersigned not later than 12 noon on Monday, June 23, 1952.

The Council do not bind themselves to accept the lowest or any tender.

J. BROCK ALLON,
Town Clerk.

Town Hall,
Wolverhampton. (A 114)

ASHBOURNE URBAN DISTRICT COUNCIL

PUBLIC LIGHTING SCHEME—STAGE 1

THE COUNCIL invite tenders from experienced firms for the SUPPLY AND ERECTION of the following approximate number of street lamps:—

No. 28—140W SODIUM LAMPS complete with standards.

No. 70—150W TUNGSTEN LAMPS complete with standards.

Plan, general conditions of contract, specification and requirements of contract may be obtained from the office of the Engineer and Surveyor, King Edward Street, Ashbourne, upon receipt of a deposit of £1 1s. which will be returned on receipt of a bona-fide tender not subsequently withdrawn.

Tenders with all documents should be enclosed in plain sealed envelopes endorsed "Tender for Street Lighting: Stage 1," and should reach the office of the undersigned not later than Monday, July 7, 1952.

The Council do not bind themselves to accept the lowest or any tender.

F. HUGH THOMAS,
Clerk to the Council.

Compton Offices, Ashbourne.
May 30, 1952. (A 125)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ASSISTANT MECHANICAL ENGINEER wanted for large Power Plant equipped with h.p. Water Tube Boilers, Turbines, and up-to-date auxiliaries. Applicants should have some years experience in this type of plant and possess a Higher National Certificate or its equivalent. Age not less than 32 or more than 45. Non-Contributory Pension scheme. Commencing salary £840. Position offers good prospects for a suitable man.—Reply to Box No. 1763, Electrical Times, quoting reference TME/2. (A 52)

HER MAJESTY'S COLONIAL SERVICE

APPLICATIONS are invited for the following posts:—

Vacancies exist in the department of Telecommunications, Federation of Malaya and Singapore for (a) ASSISTANT CONTROLLERS (ENGINEERING) (Ref. No. 27323/8) and (b) ASSISTANT CONTROLLERS (RADIO) (Ref. No. 27323/8A).

Candidates for both (a) and (b) must be Graduate Members of the Institution of Electrical Engineers or possess a degree or a diploma recognised by that Institution as granting exemption from Parts A and B of its examination. They must have had for (a) two years' practical experience in telecommunications work and for (b) two years' practical experience in radio-communications work (three years if examination subjects did not include telecommunications or radio-communications subjects). Normal duties for (a) include the executive control of a telecommunications Region and responsibility for maintenance installation and operation of all manual and automatic exchanges, multi-channel carrier equipment, teleprinters and U.F. telegraph apparatus, overhead and underground line plant, railway signalling equipment, multi-channel V.H.F. equipment and minor radio stations. Normal duties for (b) include the operation and control of a radio district within a Telecommunication Region. Candidates should have a good knowledge of long range R.T. and W.T. point to point and aeradio; aircraft and marine navigational aids; U.H.F. fixed and mobile communications, and trunk communications, and minor land-line communications.

Candidates must be between 23 and 35 years. Appointment will be on pensionable or contract terms. The pensionable salary scale is from £742 to £1,652 per annum, point of entry depending on experience. Contract salaries are 10% higher with a gratuity of £25 per quarter on satisfactory completion of contract. A cost-of-living allowance is payable. Government quarters are provided at a nominal rent and free passages on first appointment and once each way during each tour of service are provided for the officer, his wife and three children under the age of 10 years.

Intending candidates should apply in writing to the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, S.W.1, giving brief details of their age, qualifications and experience. They should mention this paper and quote the reference number shown against the post for which application is made. (A 95)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following Superannuable position at Divisional Headquarters. Salary and conditions of service will be in accordance with the National Joint Board Agreement.

THIRD ASSISTANT ENGINEER (CIVIL & MECHANICAL)
Transmission Department

Salary Class "AX/CX," Grade 5, £629-£810 per annum (plus London Weighting).

Applicants for this appointment should have received theoretical and practical training in Civil and/or Mechanical Engineering and preferably should have passed either Parts A and B of the examination for Associate Membership of the Institution of Civil Engineers or the Graduate Membership Examination of the Institution of Mechanical Engineers or hold qualifications exempting therefrom, and should have had experience in the design and setting out of Site works, foundations for buildings and heavy plant, and also in the construction of electrical transmission lines erected on lattice steel towers. Experience in the interpretation of specifications, the scrutiny of drawings and in dealing with correspondence is desirable.

Applications, stating age, qualifications and experience, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N. 14, by June 14, 1952.

W. N. C. CLINCH,
Controller.
(A 101)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary and conditions of service in accordance with N.J.B. Agreement, Schedule "A," inclusive of London Allowance.

STATION SUPERINTENDENT
Deptford East Generating Station

Qualifications: sound technical training and wide practical experience in electrical and mechanical engineering and in power station practice. Candidates must be competent works managers and good organisers, have had practical experience of Negotiating and Consultative Committees and in promotion of good labour relations. The officer will be responsible for the general management and operation of the Station. Salary—Class "H," Grade 1—£1,260 p.a.

SHIFT CHARGE ENGINEER
Brunswick Wharf Generating Station

Qualifications: sound technical training in electrical and mechanical engineering and practical experience in operation and maintenance of modern generating plant with P.F. fired boilers. Character and ability to deal with Staff problems is important. Salary—Class "H," Grade 7—£784 7s. p.a.

ASSISTANT ENGINEER (COAL & ASH HANDLING)
Deptford East and West Generating Stations

Qualifications: sound engineering training, followed by experience in operation and maintenance of power station plant. The successful applicant will be responsible for the operation and maintenance of the entire Coal and Ash Handling Plant, etc. of the Stations. Salary—Class "L," Grade 11—£731 17s. p.a.

Applications, stating age, qualifications and experience, addressed to Divisional Secretary, B.E.A., London Division, Ergon House, Horseferry Road, S.W.1, within 14 days of this advertisement. (A 97)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the following appointments in the Operations Department at Divisional Headquarters, Woolton.

(a) SECOND ASSISTANT ENGINEER (System Liaison). Salary £809 to £945, N.J.B., Class "AX," Grade 2.

(b) GENERAL ASSISTANT ENGINEER. Salary £481 to £619, N.J.B., Class "AX," Grade 8.

Both appointments superannuable.

Applicants for (a) should be Corporate Members of the Institution of Electrical Engineers or should hold equivalent qualifications. The successful candidate will be responsible for liaison and co-ordination of operation between generating stations (thermal and hydro), transmission sections, Grid Control at Manchester and the Area Board Operating Staff.

Applicants for (b) must have a good general and technical education and possess a recognised degree in engineering or equivalent qualifications. Knowledge of station operation will be an advantage.

Applications forms can be obtained from the Divisional Secretary, Beaconsfield Road, Woolton, Liverpool. Closing date June 17, 1952.

W. A. GALLON,
Divisional Controller.
(A 118)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following Superannuable position. Salary and conditions of service will be in accordance with the National Joint Board Agreement:—

ASSISTANT SHIFT CHARGE ENGINEER
Rye House Generating Station

Applicants should preferably have served an apprenticeship and have obtained a National Certificate in Electrical and/or Mechanical Engineering or equivalent and possess experience in the operation of a Generating Station.

Experience in the operation of modern pulverised fuel boilers and in the control of men, will be advantageous.

Salary Class "G," Grade 9, £621-£648 per annum.

Applications, stating age, qualifications and experience, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by June 14, 1952.

W. N. C. CLINCH,
Controller.
(A 100)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 734.—DEPUTY POWER STATION SUPERINTENDENT at Agecroft H.P. Generating Station, Salford, Lancs. Salary £946-£989 (N.J.B. G.3). Experience of pulverised fuel an advantage. Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before June 21. Quote Vacancy No. (A 102)

CITY OF PIETERMARITZBURG (SOUTH AFRICA)

POSITION OF ASSISTANT CITY ELECTRICAL ENGINEER AND TRANSPORT MANAGER

APPLICATIONS are invited from qualified electrical engineers under 45 years of age for the position of Assistant City Electrical Engineer and Transport Manager on salary grade £850 by £50 to £1,100 per annum plus cost of living allowance while in force (at present £204 per annum if married and £144 6s. 0d. if single) and car allowance (at present £15 10s. 0d. per month).

Applicants should be Associate Members of the Institution of Electrical Engineers and will be required to obtain a Union Government Electrical Engineer's Certificate of competency within a year of appointment. Experience in municipal electricity undertakings, including distribution and workshop practice and general administration, is essential. Possession of mechanical engineering qualifications and/or experience of a transport undertaking will be an additional recommendation.

The Council is prepared to assist towards passage to South Africa.

Further particulars regarding the post and the Department (which controls both the Electricity and Public Passenger Transport Undertakings of the Municipality) and general information in regard to Pietermaritzburg may be obtained from Messrs. Merz and McLellan, Millburn, Esher, Surrey, to whom applications in candidate's own handwriting, stating age, qualifications, present appointment, particulars of past service and experience, period after appointment when duties can be commenced and any other essential information, accompanied by not more than three recent testimonials, must be addressed and delivered by June 25, 1952.

(A 113)

BRITISH ELECTRICITY AUTHORITY

South Western Division

GENERAL ASSISTANT ENGINEER required in the Technical Department, Bristol.

Superannuation Scheme. Salary N.J.B. Class "AX/CX," Grade 8, £481 to £655.

Applicants should possess technical qualifications leading to Associate Membership of the I.E.E., and have had works experience with electrical equipment manufacturers.

Duties will include commissioning and maintenance of protective and control equipment at generating and transmission stations.

Interest in design, testing and fault current calculations essential.

Apply by June 14, 1952, stating age, qualifications, experience, present appointment and salary, to R. C. Barrett, Divisional Secretary, 26 Oakfield Road, Bristol 8.

May 26, 1952. (A 56)

LONDON ELECTRICITY BOARD

ENGINEER (TEST)

APPLICATIONS are invited for the above position in the Meter and Testing Branch of the Western Sub-Area at Fulham, S.W.6.

Applicants should preferably have a wide experience of various makes of automatic telephone exchanges, magneto and selector systems and of telephone cable jointing. The successful applicant will be responsible to the Sub-Area Testing Engineer for the upkeep of the Sub-Area telephone system and for supervising the installation of any new work in connection therewith. He will also be responsible for dealings with the G.P.O. Communication Dept. in connection with Sub-Area requirements.

The post is graded under Schedule "A" of the National Joint Board agreement as Class "L," Grade 13, £625 16s. per annum rising to £656 5s. per annum, including London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by June 14, 1952. Please enclose addressed foolscap envelope and quote Ref. V/1455/T on all correspondence. (A 110)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of SECOND ASSISTANT ENGINEER in the Planning and Development Section of the Engineer's Staff, Central Sub-Area, Cardiff.

Candidates should have had a sound engineering training and experience of distribution work in urban, industrial and rural areas. Experience in planning work is essential and some experience in d.c.-a.c. changeover work desirable.

Corporate membership of the Institution of Electrical Engineers or equivalent qualification will be an advantage.

Salary in accordance with Class "L", Grade 7 (£901-£921-£942) of the N.J.B. Schedule for the electricity supply industry.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by June 14, 1952.

D. G. DODDS,
Secretary.
St. Mellons, Cardiff. (A 115)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions:
Vacancy No. 51/52

ELECTRICAL MAINTENANCE ENGINEER, LINCOLN

Candidates should have had a thorough training and possess considerable experience in the maintenance of all types of electrical equipment found in modern generating stations. Preference will be given to engineers who possess a Higher National Certificate in Electrical Engineering.

The salary will be in accordance with Class "F," Grade 6, of the National Joint Board Schedule "A" (£713 to £747 p.a.).

Closing date for receipt of applications, June 17, 1952.
Vacancy No. 52/52

BOILER HOUSE SHIFT CHARGE ENGINEER, Longford Generating Station, Coventry.

Applicants must possess a sound technical training and have had good engineering experience, a knowledge of the control and operation of large water tube boilers, ancillary plant and in the efficient combustion of fuels on chain grate stokers.

The salary will be in accordance with Class "G," Grade 9 of the National Joint Board Schedule "A" (£621 to £648 p.a.).

Closing date for receipt of applications, June 23, 1952.

The above appointments will be pensionable within the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham.

L. F. JEFFREY,
Divisional Controller.
(A 117)

LONDON ELECTRICITY BOARD

SENIOR DRAUGHTSMAN

APPLICATIONS are invited for the above position in the Design and Planning Branch of the Northern Sub-Area, at Aldersgate Street, E.C.1.

Applicants should have had training and experience in building construction and the design of steelwork and reinforced concrete structures, and be capable of preparing drawings and making calculations for the alteration of existing premises and the conversion of basements into sub-stations and transformer chambers. Experience in the layout of electrical equipment up to 11 kV, whilst not essential, would be an advantage.

The post is graded under Schedule "D" of the National Joint Board Agreement as Senior Draughtsman, Grade 5: £574 7s. to £683 11s. per annum, inclusive of London Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by June 17, 1952. Please enclose addressed foolscap envelope and quote Ref.: V/1468/T on all correspondence. (A 119)

EASTERN ELECTRICITY BOARD

Essex Sub-Area

APPOINTMENT OF SUB-AREA ACCOUNTANT

APPLICATIONS are invited from qualified accountants for the appointment of accountant for the Essex Sub-Area.

The salary will be fixed within the range £1,275 per annum to £1,425 per annum, and future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, stating age, qualifications, experience, present salary and position, should be submitted to the Manager, Essex Sub-Area, Eastern Electricity Board, "Millfield," Bentley, near Brentwood, Essex, within 14 days of the appearance of this advertisement (A 84)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of ASSISTANT ENGINEER (MAINS) in District 226 (Llanelly) in the West Central Sub-Area of the Board.

Applicants should have had experience in the construction, maintenance and operation of overhead and underground mains, preference will be given to those who possess the Higher National Certificate or its equivalent.

The salary will be in accordance with Class "E", Grade 7 (£629-£645-£660) of the N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by June 14, 1952.

D. G. DODDS,
Secretary.
St. Mellons, Cardiff. (A 116)

CROWN AGENTS FOR THE COLONIES

QUALIFIED candidates are invited to apply for the following posts:—

ELECTRICAL ENGINEER (M.29024.B), required for the Central Electrification Scheme in Cyprus, for two tours each of two years with prospect of permanency. Salary according to qualifications and experience in the scale £960, rising to £1,200 a year. Cost-of-living allowance at present 10% of salary. Free quarters and passages. Liberal leave on full salary. Candidates must have had considerable experience in the maintenance and operation of a modern generating station; the erection and maintenance of high and low voltage overhead and underground a.c. distribution systems and substation plant; and administrative duties associated with a public electricity supply undertaking. Preference will be given to candidates who are Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications.

SENIOR INSTRUCTOR (ELECTRICAL) (M.25359.B) required by the Government of the Federation of Malaya for three years with prospect of permanency. Commencing salary according to age and experience payable in local currency in scale equivalent at the present Government rate of exchange to £714 a year, rising to £1,078 a year (including expatriation pay). Cost-of-living allowance between £336 to £616 a year according to salary and dependents. Free passages. Liberal leave on full salary. Candidates must have served an apprenticeship to electrical engineering followed by two to three years industrial experience. They must be thoroughly experienced in electrical installation trade practice and domestic and industrial wiring (including motors, generators, etc.) and should possess a full Electrician's Certificate (or Final Certificate in Electrical Engineering practice) of the City and Guilds Institute or equivalent.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter the reference number shown against the post for which application is made. The Crown Agents cannot undertake to acknowledge all applicants and will communicate only with applicants selected for further consideration. (A 57)

SOUTHERN ELECTRICITY BOARD

LOCAL ENGINEER

ALDERSHOT District (Petworth) of No. 3 (Portsmouth) Sub-Area, Salary N.J.B., Class "F," Grade 9, Column 1 (£587 per annum) N.J.B. Conditions of Service.

Applicants should have had experience in the operation of H.V. and L.V. overhead and underground distribution systems and substation plant. The successful applicant will be required to carry out construction work on the L.V. system, together with such general duties as may be allocated by the District Engineer. The appointment will involve standby duties.

The successful candidate for the above appointment will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him, in envelopes endorsed "Local Engineer," not later than June 16, 1952.

F. W. KEMPTON,
Secretary.
June 5, 1952. (A 96)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

GENERAL ASSISTANT ENGINEER (ELECTRICAL) required in Construction Department at Wolverhampton. N.J.B. service conditions superannuable appointment, salary within Schedule "C," Grade 8, £481-£674 per annum.

Higher National Certificate in electrical engineering or equivalent qualification required, together with a sound general training with a large electrical engineering firm and/or experience of power station work.

Application forms, available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be returned completed by June 21, 1952.

F. W. LAWTON,
Divisional Controller.
(A 103)

BRITISH ELECTRICITY AUTHORITY

South Western Division

FOREMAN FITTER (mechanical) required at Hayle Generating Station, Cornwall.

N.J.I.C. Conditions of Employment. Wages 3s. 4½d. plus 4d. per hour. Steam Turbine experience desirable, all round knowledge of workshop practice and ability to supervise personnel essential.

Apply in writing to nearest Labour Exchange, quoting "Station Superintendent, Hayle Generating Station," stating age, qualifications, experience, present position and wages rate, by June 14, 1952.

May 29, 1952. (A 99)

BRITISH ELECTRICITY AUTHORITY

South Western Division

GENERAL ASSISTANT ENGINEER required in the System Operation Department, Divisional Headquarters, Bristol.

Superannuation Scheme. Salary N.J.B. Class "AX/DX," Grade 8, £481 to £619/£661 to £674.

Good general and technical education essential, and applicants should have passed the I.E.E. examination or equivalent. Steam generating station experience an advantage.

Successful applicant will be required to undertake general system operation and statistical work.

Apply by June 27, 1952, stating age, full particulars of education, training, qualifications, experience, present appointment and salary, to R. C. Barrett, Divisional Secretary, 26 Oakfield Road, Bristol 8.

May 27, 1952. (A 58)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF GENERAL ASSISTANT ENGINEER OPERATION AND MAINTENANCE

Sub-Area Headquarters, Hazel Grove

APPLICANTS should have experience in the operation and maintenance of urban and rural networks, including o/h and u/g cables at voltages up to 11 kV, and in high voltage testing and fault localising.

Salary scale: Class "G," Grade 13—£476 £494 p.a. N.J.B. conditions.

Application forms can be obtained from the Sub-Area Manager, No. 7 Sub-Area, The North Western Electricity Board, Chapel Street, Hazel Grove, Cheshire, and must be returned to him by June 14, 1952. (A 83)

NOTTS. EDUCATION COMMITTEE

County Technical College, Worksop

REQUIRED for September 1, 1952, ASSISTANT to take electrical engineering and allied subjects to Ordinary and Higher National Certificate standard. The post is Grade "B" on the Burnham Scale. Applicants should possess a degree or the equivalent.

Further particulars may be obtained from the Principal to whom applications should be made on the form provided which should be returned not later than 10 days after the first appearance of this advertisement.

J. EDWARD MASON,
Director of Education.
(A 55)

SOUTH EASTERN ELECTRICITY BOARD

GENERAL ARCHITECTURAL AND SURVEYING ASSISTANT

Mid-Sussex Sub-Area

SALARY £560 by £20—£620, Grade 4. Superannuable. Candidates must be competent draughtsmen with considerable experience in the surveying of lands and buildings, buildings design and the construction and maintenance of buildings by contract and direct labour. Preference given to qualified applicants.

Applications, giving two referees, must reach H. Pryce-Jones, M.Enge., M.Inst. C.E., Mid-Sussex Manager, SEEBoard, Mid-Sussex House, North Road, Brighton, by June 18, 1952.

A. L. BURNELL,
Secretary.
May, 1952. (A 98)

EASTERN ELECTRICITY BOARD

APPOINTMENT OF SUB-AREA MANAGERS

APPLICATIONS are invited to fill vacancies arising from the resignation of the manager of the Suffolk Sub-Area and the retirement of the manager of the Chilterns Sub-Area.

The appointments are superannuable and the salary in each case will be up to £2,200 a year, according to qualifications and experience. Applications from suitably qualified candidates should reach the Secretary, Eastern Electricity Board, Wherstead, Ipswich, by June 19, 1952. (A 85)

APPLICATIONS are invited for the position of EXPERIMENTAL ENGINEER in the Aircraft Test Laboratory of the English Electric Co. Ltd., at Warton, to work on the development and approval testing of aircraft electrical systems. Applicants should have at least H.N.C. and practical electrical or mechanical engineering experience.—Please write, giving full details and quoting Ref. 434H, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (A 44)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

APPLICATIONS are invited from ELECTRICAL CONTRACTS ENGINEERS for handling orders for steel works installations and other metal industries projects both as respects power units and associated control schemes. Preference will be given to applicants between 25 and 35 years of age who have served recognised apprenticeship, hold at least Higher National Certificate and have had previous manufacturing contractual experience. Permanent progressive positions, pension scheme. Successful applicants will have to find own accommodation, but for a limited period arrangements will, in appropriate cases, be made for special financial assistance.—Apply, stating age, qualifications, experience and quoting ref. 489C, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (A 51)

APPLICATIONS are invited from ELECTRICAL ENGINEERS having at minimum Higher National Certificate for vacancies in Switchgear Contracts Department, Stafford. Previous contractual experience of large-scale switching schemes as applied to power stations, substations and special and general industrial applications desirable but knowledge of switchgear control metering and protection schemes essential. Permanent progressive staff appointments with pension scheme. Successful applicants will have to find own accommodation, but for a limited period, arrangements will be made for special financial assistance.—Apply, stating age, qualifications and experience, quoting ref. 446C, to Central Personnel Services, English Electric Co., Ltd., 24/30 Gillingham Street, London S.W.1. (A 72)

ARMATURE WINDER capable of taking charge of small repair shop employing 14 hands; must be accustomed to repair shop practice; good remuneration. No house. N.E. Scotland.—Box No. 1771, Electrical Times. (A 66)

ASSISTANT MANAGER required for our small branch works engaged in the production of standard and special fractional h.p. motors of various types a.c., d.c. and universal. Must have experience in administration and production and be fully conversant with the design and development of these motors. Preferably aged 35-40, with Higher National Certificate in electrical engineering. Good salary and prospects of advancement. Five-day week. Pension scheme, etc.—Applications in writing, stating full details of experience, educational qualifications and salary requirements, to Personnel Department, George Kent Ltd., Biscot Road, Luton, Beds. (A 87)

ASSISTANT TECHNICAL SALES REPRESENTATIVE required for the sale of our electrical distribution equipment and cable accessories in the London area and the Southern Counties. Applicants should have sufficient technical knowledge and training to promote the sale of our comprehensive range of electrical distribution products comprising substation fusegear, industrial switchgear, feeder and distribution pillars, network disconnecting boxes, house service cutouts, and cable joint boxes. Selected applicants will be interviewed in the London area.

Please apply, stating age, qualifications and experience, to the Secretary, W. Lucy and Co. Ltd., Eagle Ironworks, Oxford. (A 104)

ASSISTANT TEST ENGINEER for high voltage testing work. Technical education to at least Ordinary National Certificate standard. Previous electrical testing experience necessary.—Write for interview, giving training and experience, to The Assistant Secretary, The Micanite and Insulators Co., Ltd., Empire Works, Blackhorse Lane, E.17. (A 68)

BRITISH ELECTRICITY AUTHORITY require a SECTION LEADER in the Drawing Office at Headquarters in London. Candidates must have proved ability in the supervision and control of drawing office staff, together with considerable experience on power station layout. Salary N.J.B. Grade 3, £793 to £902, including London Allowance.

Forms from D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London W.1, to be returned by June 23, 1952. Quote reference AE.261. (A 59)

CONTRACT ENGINEERS required for cable construction work. Liberal subsistence allowance when working away.—Replies, stating experience and salary required, to Contracts Department, Pirelli-General Cable Works Ltd., Leigh Road, Eastleigh, Hants. (A 61)

DESIGN ENGINEER with specialised experience in low tension domestic switchgear. Must be conversant with design for mass production. A good starting salary is offered and there are excellent prospects for a first-class man having this specialist experience.—Write in full confidence, giving details of experience and salary required, to Box No. 1767, Electrical Times. (A 63)

DRAUGHTSMEN required, preferably with experience in any of the following: design of circuit-breakers and metalclad switchgear, industrial control gear, switch and control board layout, diagrams of connections, traction control gear. Applications from good mechanical draughtsmen are also invited. Good remuneration for experienced men.—Apply, quoting "Switchgear," stating age, experience and salary required, to General Electric Co. Ltd., Witton, Birmingham 6, through your nearest Employment Exchange. (A 88)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, *or a woman aged* 18-59; *unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order,* 1952.

DRAUGHTSMEN required for cable-laying contract work, liberal subsistence allowance when working away.—Apply by letter in first instance to Contracts Department, Pirelli-General Cable Works, Ltd., Leigh Road, Eastleigh, Hants. (A 41)

ELECTRICAL ENGINEER for Steelworks in Sheffield area. To be responsible to chief engineer for the installation and maintenance of electrical plant and equipment. Higher National Certificate in Electrical Engineering or equivalent qualifications essential.—Write, giving full details of age, experience, qualifications and salary required to Box No. 1753, Electrical Times. (A 46)

ELECTRICAL ENGINEER. Unusually attractive opening occurs at high level for key sales executive with company of international repute. Degree in electrical engineering preferable. Successful applicant must have strong personality, good social background and be capable administrator.—Write, giving full details, salary expected, to Box E.T. 275, at 191 Gresham House, E.C.2. (A 70)

ELECTRICAL INSPECTOR. The Ford Motor Co. Ltd., of Dagenham, Essex have vacancy for man between 35 and 45 years of age. Should possess good general and technical education, with training in electrical engineering. Preference given to applicant experienced in installation, operation and maintenance of h.t. and l.t. substation equipment, paper cables and lighting and power wiring installation. Must be thoroughly acquainted with I.E.E. and Home Office Regulations.—Write, giving full details of education, qualifications, experience, and salary required, to Salaried Personnel Department, quoting reference T/E1. (A 43)

ELECTRIC water heaters. Three SALES ENGINEERS with sound experience in selling above required for Midlands and N. Wales, Eastern Midlands and East Coast, South and South-East Coast. Good salary, commission and travelling expenses (car allowance). Excellent prospects for keen energetic men of the right experience. Position carries a pension scheme. Full details in confidence, stating area known and when available.—Gillott Electro-Steam Cookers, Chalford, Glos. (A 91)

ELECTRICAL WHOLESALERS require an ASSISTANT to the Sales Manager. Must have good knowledge of trade and conversant with catalogue compilation. Also, CLERK for Switchgear Department.—Apply, London Electrical Co., 92 Blackfriars Road, London, S.E.1. (A 53)

ELECTRICAL ENGINEERS. The Steel Company of Wales Ltd. (Steel Division), is about to form an Electrical Engineering Development Department to handle large extensions, and has the following vacancies. All applicants must possess an Electrical Engineering Degree (or equivalent) and must have had considerable experience in heavy industry (preferably in iron and steel works).

1. DEVELOPMENT ENGINEER to take full charge of the Department.
2. CO-ORDINATING ENGINEER to supervise commercial matters, office records, etc.
3. MACHINES AND CONTROL GEAR ENGINEER. Applicants must have had design experience with a leading manufacturer.
4. COMMUNICATIONS AND ELECTRONICS ENGINEER
5. CHIEF SITE ENGINEER for supervision and progressing of contracts and commissioning of plant.
6. FOUR ASSISTANT SITE ENGINEERS.
7. CHIEF DRAUGHTSMAN.

Applications should be in own handwriting addressed The Personnel Superintendent, The Steel Company of Wales Limited, Box No. 3, Port Talbot. (A 123)

ENGINEER REQUIRED. An old established cable manufacturing organisation requires an engineer experienced in general electrical engineering, particularly generation and distribution, and combining commercial knowledge for a sales company in Karachi. Professional qualifications desirable, but sound all-round experience essential. Good salary and expenses and excellent prospects for the right man who would join the Board of the local company in Pakistan.—Write: Box No. 1795, Electrical Times. (A 112)

GRADUATE ELECTRICAL ENGINEER, aged 20 to 30 years, required by cable manufacturer for testing high voltage cable installations in all parts of the British Isles. Applicants must have completed National Service. Commencing salary £7 to £9 per week according to experience; permanent appointment for suitable man.—Apply in writing, stating age, qualifications and experience, to Box No. 1765, Electrical Times. (A 60)

GENERAL ASSISTANT ENGINEER required by Merseyside and North Wales Electricity Board, in the No. 4/5 Sub-Area, based on North Wales. Salary £532 to £553 per annum (N.J.B. J.13).

Applicants should have had experience in the laying out, erecting and setting to work of overhead and underground mains, mainly in rural areas, and the control of gangs engaged on such work.

The appointment will be superannuable and subject to medical examination.

Application forms obtainable from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, nr. Wrexham. Closing date June 16, 1952. (A 120)

GRADUATE ELECTRICAL ENGINEER required for Middle East duty by large oil company to work under desert survey conditions on the investigation, development and application of protective electrical installations for an extensive cathodic protection scheme. Applicants with degree or equivalent, and preferably several years industrial experience, should be single and under 32. Generous allowances in addition to salary. Pension fund. Paid home leave at two-yearly intervals. —Write, giving full details and quoting No. 210, to Box 5908, c/o Charles Barker and Sons Ltd., 31 Budge Row, London E.C.4. (A 122)

HOUSES are immediately available for DRAUGHTSMEN with switchgear or light electro-mechanical experience, who are successful applicants for vacancies which exist in a well-known Merseyside engineering company. Progressive positions are offered in expanding contracts or development drawing offices. Modern factory; pleasant situation. Pension scheme in operation, after qualifying period.—Write, giving full details, age, qualifications and present salary, to Box No. 1779, Electrical Times. (A 86)

IMPERIAL SMELTING CORPORATION, LTD., has a vacancy at its Avonmouth Works for an ASSISTANT INSTRUMENT ENGINEER. Applicants should be between 23 and 35 and possess National Certificate in electrical engineering. Higher National Certificate and experience of industrial instrument work will be an advantage. The ability to supervise a small group of workers and to work well with staff at all levels will be looked for.—Applications should be submitted in the first place to the Ministry of Labour and National Service, Employment Exchange, Avonmouth, Bristol, quoting the ref. AIE ET. (A 67)

JUNIOR ELECTRICAL ENGINEER aged 22-30 required for Research and Development work in connection with electrical accessories, low tension switch and fusegear, etc. Must be capable of working on own initiative and running a small laboratory. London area. Applicants should have good educational qualifications, Higher National Certificate, Int.B.Sc. or Grad. I.E.E., and should preferably have served a recognised apprenticeship. Excellent prospects and a good salary is offered.—Write with full particulars to Box No. 1729, Electrical Times. (A 38)

LEADING AND SENIOR DRAUGHTSMEN required for transformer work of the largest class.—Apply by letter, quoting "Transformer" and giving full details of age, experience and salary required to Staff Manager, General Electric Co., Ltd., Witton, Birmingham 6, through your nearest Employment Exchange. (A 35)

LLOYD'S REGISTER OF SHIPPING invite applications for appointment as ELECTRICAL ENGINEER SURVEYORS. Applicants should be 26 to 34 years and should hold qualifications such as a degree in electrical engineering; A.M.I.E.E., or H.N.C. Ship experience not essential. Salary according to age and qualifications.—Write to Secretary, 71 Fenchurch Street, London E.C.3 for application form. (A 65)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD invite applications for the following appointments:—

COMMERCIAL ASSISTANTS

Warrington District. Salary £528 to £545 p.a. (N.J.B. F./11).

Northwich District. Salary £504 to £521 p.a. (N.J.B. E./11).

Higher National Certificate in electrical engineering or equivalent.

JUNIOR COMMERCIAL ASSISTANTS

St. Helens District. Salary £431 £447 p.a. (N.J.B. F./14).

Warrington District. Salary £431 to £447 p.a. (N.J.B. F./14).

Runcorn District. Salary £453 to £471 p.a. (N.J.B. G./14).

Ordinary National Certificate or equivalent.

For all posts duties will include estimating for contracting work, advice to consumers on electricity supply and appliances. Appointments are superannuable and subject to medical examination.—Applications, stating age, education, training, qualifications, experience and present appointment to the Manager, No. 2 Sub-Area, M.A.N.W.E.B., Electricity House, Sandiway, nr. Northwich, Cheshire. Closing date June 16, 1952. (A 121)

MANAGER required for London electrical export office of Dominion firm.—Advise age, experience and salary required to Box No. 1777, Electrical Times. (A 73)

MANUFACTURERS of domestic electrical washing appliances require COMMISSION AGENTS for the following Electricity Board areas: Eastern, Midlands, London, Southern, South Eastern, South Western.—Only those who have first-class connections with Electricity Boards and wholesalers need apply to Box No. 1769, Electrical Times. (A 64)

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REPRESENTATIVE required for Birmingham and the Midland counties. Applicants should have a good connection with electrical wholesalers and Area Board showrooms, and preferably possess a car.—Full details in strict confidence to Box No. 1755, Electrical Times. (A 49)

REPRESENTATIVE required by Electrical Wholesalers for London area. Must have good knowledge of Trade and an active connection with Industrial Concerns. Please apply in writing, stating qualifications, salary required and if car owner.—Box No. 1785, Electrical Times. (A 105)

TECHNICAL REPRESENTATIVE required by Glasgow branch of company manufacturing electric lighting fittings and accessories. Preference for man having connections with architect and contractors in Glasgow area. —Box No. 1773, Electrical Times. (A 69)

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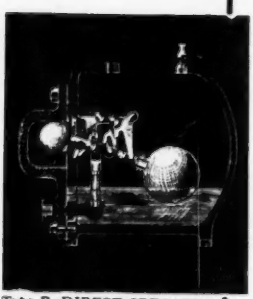

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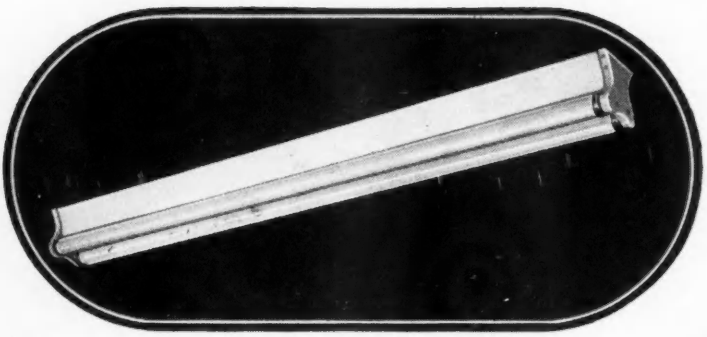

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KEEN PRICES = *More Business for You*

FROM £3·5·0

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SMART & BROWN (ENGINEERS) LIMITED

TRADING ESTATE, SPENNYMOOR, Co DURHAM

IN EVERY TYPE OF WINDING WIRE

The "Lewcos" range of products covers all known types including Cotton, Silk, Rayon, Enamel, Lewmex, Glass, Asbestos and combined coverings.

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THE LONDON ELECTRIC WIRE COMPANY AND SMITHS, LIMITED
Church Road, Leyton, London, E.10

Incorporating FREDERICK SMITH AND COMPANY
Associated with THE LIVERPOOL ELECTRIC CABLE COMPANY LIMITED, AND VACTITE WIRE COMPANY LIMITED

"It's beautifully clear, Mr Ash."

"And very strong too, Mr Downs."

"*It's like the lens ring for an electric torch we made recently, Mr Ash. That had to be completely transparent, perfectly accurate, and at the same time decorative and strong enough to stand up to rough treatment.*"

"How did you manage all that, Mr Downs?"

"*It was moulded in clear Polystyrene, Mr Ash. The strengthening shoulder round the moulded screw thread was formed at the same time into a relief pattern of circular bosses. All made in one operation, Mr Ash.*"

"So now the customer has seen the light, Mr Downs."

"*He has indeed, Mr Ash. He said*

If you want to know what plastics can do for you

ask Ashdowns

ASHDOWNS LIMITED

ECCLESTON WORKS, ST. HELENS, LANCS. Phone: St. Helens 3206. *Ashdowns Ltd. is a subsidiary of Pilkington Brothers Ltd.*

Automatic electric control

of
heating installations
ventilating installations
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by means of
time switches
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Descriptive matter on application!

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SOLE AGENTS: NATHAN & ALLEN, LTD.
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Osram

FLUORESCENT TUBES

reduced prices

These substantial reductions apply to all standard colours from **1st June 1952**

5 ft	80 watt	reduced by	**2/6**
4 ft	40 watt	reduced by	**2/3**
Smaller sizes also reduced			

★ **The prices of general lighting service lamps and other types of Osram lamps have been increased from 1st June**

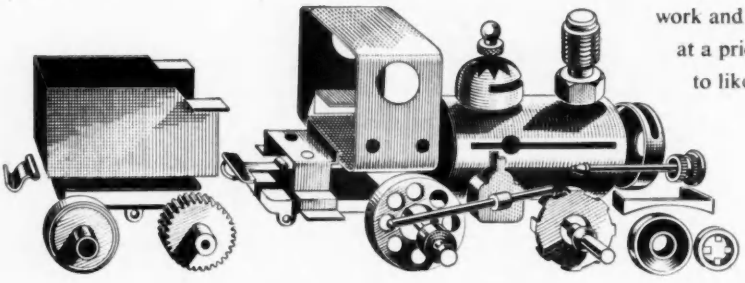
Full details on application

Announcement of The General Electric Co Ltd

E

HIGH SPEED AUTOMATICS

Modern machinery and mass production methods give you top quality capstan and automatic work and sheet pressings at a price you are sure to like—and on time



GRIFFITHS, GILBART LLOYD & Co. Ltd.

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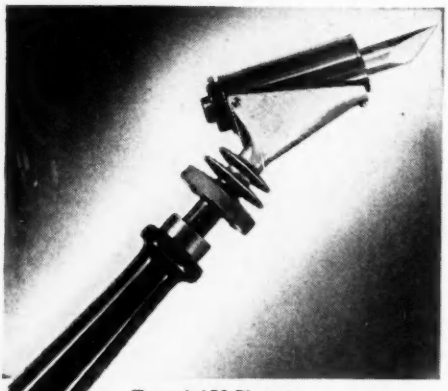
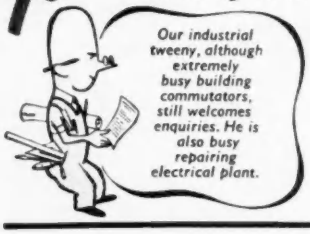


Type A 150 Electric Soldering Iron


Our industrial tweeny, although extremely busy building commutators, still welcomes enquiries. He is also busy repairing electrical plant.

Soldering Irons for every purpose

There is a Browleco Electric Soldering Iron for every kind of work in the electrical industry. Browning's have specialised in their manufacture since 1920 and each iron is guaranteed. Drop a line to the address below and find out more about them.

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TELEPHONE: GRANGEWOOD 4003 (4 LINES)

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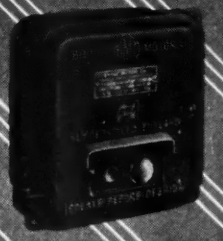
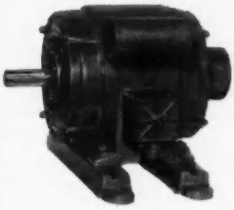
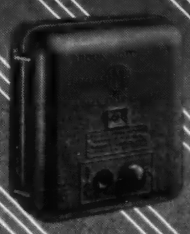


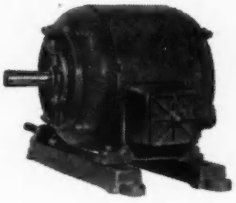
CAVITY MOUNTING STARTER



'EMPRESS' SINGLE PHASE MOTOR



AUTOMATIC DIRECT SWITCHING STARTER



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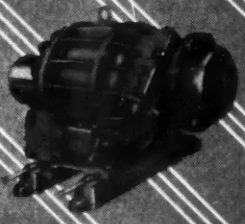
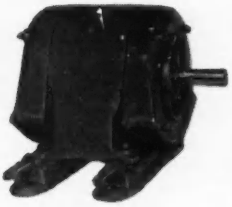
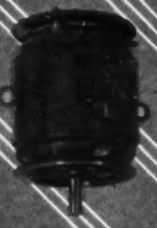


EXPLOSION PROOF MOTOR



DOWN-DRAFT DRIP PROOF MOTOR



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MAKERS OF A.C. ELECTRIC MOTORS AND CONTROL GEAR

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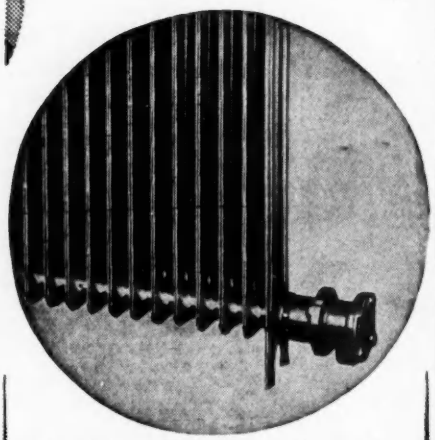

Ideal for Cellulose Spraying Rooms, Petroleum Stores, Operating Theatres, etc.

FLP ⬅ **THIS IS YOUR SAFEGUARD**

Where safety is the first consideration "Dunlow" Flameproof Heaters are essential. The heating unit in these radiators is similar to our water and oil

FLAMEPROOF IMMERSION HEATERS

Certified by Buxton

"Dunlow"

DUNCAN LOW LTD

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He always said...

"The hammer is mightier than the screwdriver."

★ *Inspired by the well known "Yachting World" aphorisms appositely modified by*

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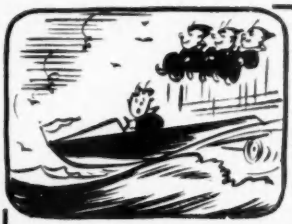

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"Yo ho, bully boys, yo ho!
Over the wavelets we go.
All engineers need, Is FLUXITE for speed! . . .
Like floating on air" observed OH.

For all SOLDERING WORK—you need FLUXITE—the paste flux—with which even dirty metals are soldered and "tinned". For the jointing of lead—without solder; and the "running" of white metal bearings —without "tinning" the bearing. It is suitable for ALL METALS—excepting ALUMINIUM. With Fluxite, joints can be "wiped" successfully that are *impossible by any other method.*

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INDEPENDENT TEST PROVES SUPERIORITY OF ATLAS 'DOUBLE-LIFE' LAMPS!

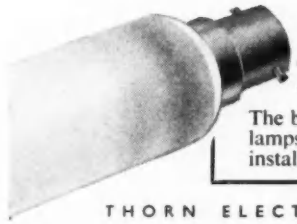
In an independent test, 10 ATLAS 'double-life' lamps were used alongside 10 lamps of another well-known brand with these results :—

LAMPS	IN USE FOR	REPLACEMENTS
10 ATLAS	2,750 hours	NIL
10 others	2,750 hours	12

The test was discontinued at 2,750 hours and ATLAS lamps specified for future use.

*At the end of this independent test, every ATLAS 'double-life' lamp was still burning brightly with no sign of black rings.**

Endurance tests in our laboratories and reports now coming in from the first installations of 'double-life' lamps put into service fifteen months ago, show they are still giving their full rated illumination. In many cases, life is well past the 5,000 hour mark! These reports fully justify the ATLAS 'double-life' 5,000 hour guarantee.



***WATCH FOR THOSE TELL-TALE BLACK RINGS.**

The black rings which can be seen at the ends of many fluorescent lamps are a warning that replacement is due. This is the time to install ATLAS 'double-life' lamps.

THORN ELECTRICAL INDUSTRIES LIMITED

Lighting Division

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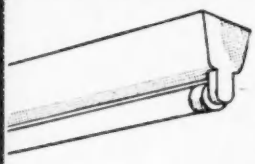
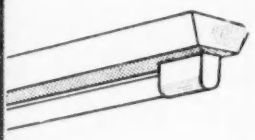
LOW-PRICED FLUORESCENT FITTINGS

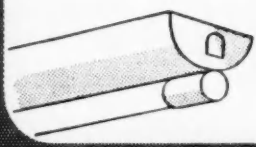


Type **DD 300**
3ft. BATTEN
Retail price:—
£3.12.6

also **DD 400**
4ft. BATTEN
£3.15.0



Type
DD 500
4ft. BATTEN
Retail price:—
£4.17.6



Type **18 R**
5ft. BATTEN
Retail price:—
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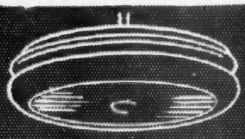
"Fluoradisc" 1001 £8.16.5



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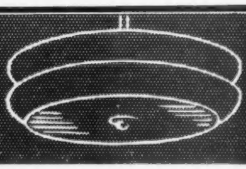
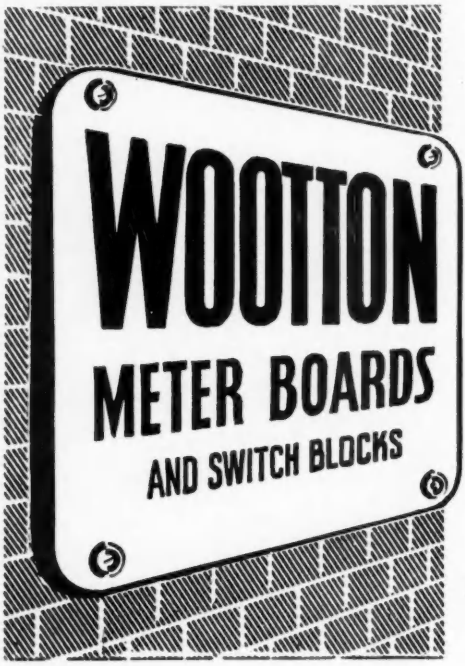


"Fluoradisc" 1005 £12.12.0



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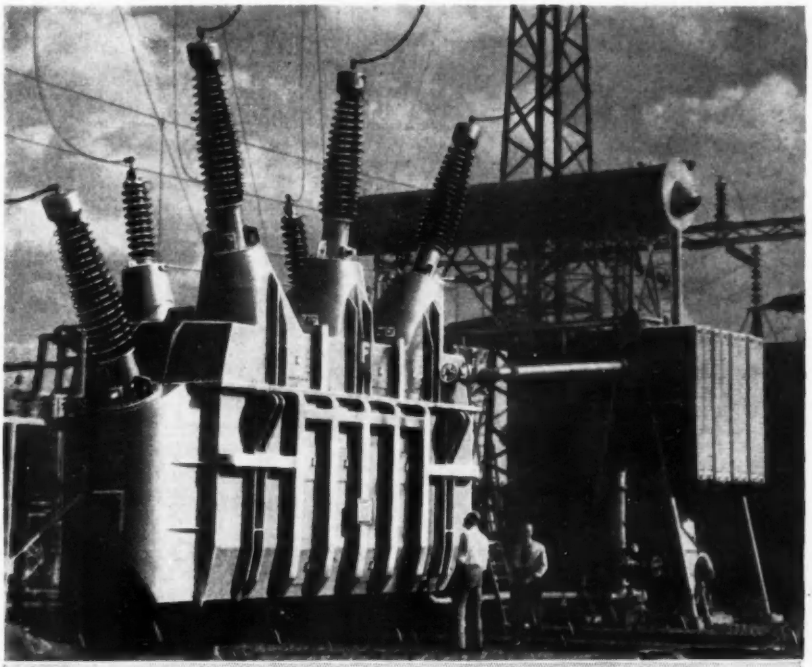

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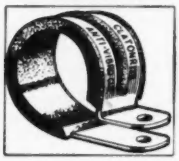

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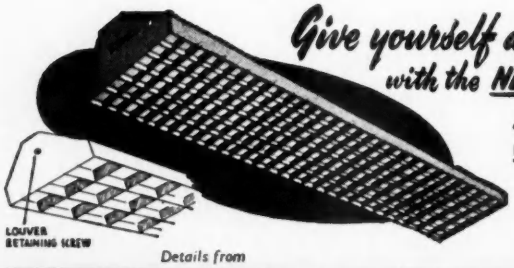

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(List prices without lamps)

Both sizes available with alternative louvers: Large Mesh 3" x 3" x 1¼"
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REDUCED PRICES

These substantial reductions apply to all
Standard colours from **1st June, 1952**

5 ft 80 watt reduced by **2/6**

4 ft 40 watt reduced by **2/3**

Smaller sizes also reduced

The prices of general lighting service lamps and other types of Elasta Lamps have been increased from 1st June

Full details on application

Announcement of Pope's Electric Lamp Co. Ltd.

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TRANSFORMERS *for*

LOW VOLTAGE LIGHTING
ELECTRONIC EQUIPMENT
ELECTRIC FURNACE
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They are available in single and three-phase types, designed to BSS 171.

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Available in
25 Watt - White Opal
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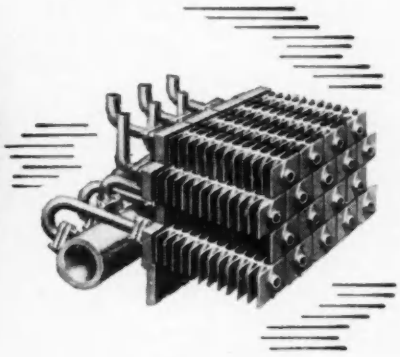

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